

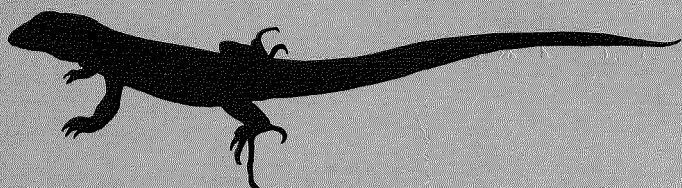
**AN ANNOTATED LIST AND GUIDE TO
THE AMPHIBIANS AND REPTILES OF MONTEVERDE
COSTA RICA**

MARC P. HAYES

J. ALAN POUNDS

and

WALTER W. TIMMERMAN



Society for the Study of Amphibians and Reptiles

SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES

**HERPETOLOGICAL CIRCULAR
NO. 17**

NEIL B. FORD, Editor
Department of Biology
University of Texas at Tyler
Tyler, Texas 75701, U.S.A

WILLIAM W. LAMAR, Associate Editor
Department of Biology
University of Texas at Tyler
Tyler, Texas 75701, U.S.A

Single copies of this circular are available at U.S. \$5.00 each including postage. Orders may be sent to Douglas H. Taylor, Department of Zoology, Miami University, Oxford, Ohio 45056, U.S.A. A list of other society publications, including *Facsimile Reprints in Herpetology*, *Herpetological Review* and the *Catalogue of American Amphibians and Reptiles*, will be sent on request to the Publications Secretary, Dr. Taylor.

**AN ANNOTATED LIST AND GUIDE TO
THE AMPHIBIANS AND REPTILES OF MONTEVERDE
COSTA RICA**

MARC P. HAYES

Department of Biology, P. O. Box 249118, University of Miami,
Coral Gables, Florida 33124

J. ALAN POUNDS

Department of Zoology, 223 Bartram Hall, University of Florida,
Gainesville, Florida 32611

and

WALTER W. TIMMERMAN

Department of Wildlife and Range Sciences,
School of Forest Resources and Conservation, University of Florida,
Gainesville, Florida 32611

Printed By:
THE UNIVERSITY OF TEXAS AT TYLER
PRINT SHOP

Contents

Abstract	1
Resumen	1
Introduction	2
Objectives of the Field List	4
Ecological Annotations	5
Distributional Zones	6
Species Descriptions	7
List Limitations	7
Observation of Amphibians and Reptiles	8
Venomous Snakes	10
Field Key to the Families of Adult Amphibians and Reptiles of the Monteverde Region	11
Field Key to the Rain Frogs (genus <i>Eleutherodactylus</i>) of the Monteverde Region	18
Field Key to the Anoles (genus <i>Anolis</i>) of the Monteverde Region	22
Field Key to the Small (<800 mm) Terrestrial and Semifossorial Colubrid Snakes	25
Species List	29
Acknowledgments	62
References	62
Index to Species List	64

Abstract: A field list and guide for the 154 amphibian and reptile species known from the Monteverde region of Costa Rica is provided. This region is defined as a broad belt extending across the Cordillera de Tilarán from 690 m elevation on the Pacific slope, to 1850 m on the continental divide, and down to 600 m on the Caribbean slope. Climate and topography are key factors influencing the distribution of amphibians and reptiles in this region: The Cordillera de Tilarán intercepts moisture-laden, northeasterly trade winds, resulting in an east-west moisture gradient. This gradient is reflected in the vegetation, which ranges from moist forest on the rain-shadowed Pacific (leeward) slope to wet and rain forest near the continental divide and on the Caribbean (windward) slope.

Fifty-eight amphibians (2 caecilians, 5 salamanders and 51 frogs) and 96 reptiles (26 lizards and 70 snakes) are recorded from this region. Descriptions of each species emphasize characters such as color, pattern, size, and shape, which are useful in identification of live animals in the field. Keys for identifying families and species in three difficult groups (anoles, rain frogs, and small snakes), also emphasize these characters. Annotations on habitat, reproductive mode, and local distribution are provided for each species.

Resumen: Se presenta una lista y guía de campo de las 154 especies de anfibios y reptiles que se conocen en la región de Monteverde, Costa Rica. La región referida constituye una faja ancha que se extiende a través de la Cordillera de Tilarán desde los 690 m de altitud en la vertiente Pacífico, hasta los 1850 m en la división continental, bajando por la vertiente del Caribe hasta los 600 m. El clima y la topografía son los principales factores que influyen en la distribución de la herpetofauna en esta zona. La Cordillera de Tilarán intercepta los vientos alisios del noreste cargados de humedad, lo que crea un gradiente de humedad del este al oeste. Este gradiente se refleja en la vegetación, la cual varía de bosque húmedo en la vertiente del Pacífico (sotavento) a los bosques nubosos y lluviosos cerca de la división continental y en la vertiente del Caribe (barlovento).

En total se registran 58 anfibios (2 cecilios, 5 salamandras y 51 ranas o sapos) y 96 reptiles (26 lagartijas y 70 serpientes). Las descripciones de las especies hacen énfasis en características como color, diseño, tamaño, y forma, que son útiles para el reconocimiento de animales vivos en el campo. Las claves que se incluyen para la identificación de familias y especies de los tres grupos más difíciles (lagartijas anolis, ranas de lluvia, y serpientes pequeñas) se basan también en dichas características. Finalmente, para cada especie se proporciona información sobre su habitat, modo de reproducción, y distribución local.

AN ANNOTATED FIELD LIST AND GUIDE FOR THE AMPHIBIANS AND REPTILES OF MONTEVERDE COSTA RICA

This revised and expanded field list includes most species that may be seen within a day's walk of the community of Monteverde, Costa Rica, among them 57 species not recorded in previous works (Van Devender 1980; Timmerman and Hayes 1981). Our knowledge of species composition and local distributional patterns in Costa Rica has advanced greatly in recent years. Increased biological research in the area and a need for comprehensive faunal lists stimulated the present edition. We have refined the area description, lengthened and improved the species annotations, and added keys and a section on observation of amphibian and reptiles. Although improved, this list is incomplete, inasmuch as the region and its fauna remain poorly known. We continue the conservative policy of including only those species for which preserved voucher specimens exist in permanent collections, or for which photographs permit identification.

The defined area (over 140 km²), which includes the Monteverde Cloud Forest Preserve, a 10,000 ha tract of largely pristine forest, represents a broad transect aligned roughly along an east-west axis that bisects the Cordillera de Tilarán, crossing the continental divide at the Brillante Gap (Fig. 1). This area extends from the confluence of the San Luis and Guacimal rivers at a elevation of 690 meters on the Pacific slope to the upper Peñas Blancas river drainage at the 600-m contour on the Caribbean slope. The area is characterized by steep slopes and narrow streambeds, often in deep ravines, suggesting that it is geologically young. The oldest dated rocks are less than 15 million years old (Middle Miocene epoch of the Tertiary period; Madrigal and Rojas 1980). Most rocks are of volcanic origin, and include primarily disordered alternations of basaltic and andesitic lavas often overlain by tufa. Soil development is generally poor throughout the region.

The climate of Monteverde is dominated by northeasterly trade winds and influenced by the area's mountainous topography. Cloud-laden winds bring moisture from the Caribbean region much of the year, but the Cordillera de Tilarán intercepts most of it, creating a rain-shadow on the leeward (Pacific) slope. Some moisture, in the form of mist, is deposited high on the Pacific slope near the divide, but the frequency of mist diminishes sharply as one moves downslope. The result is a northeast-southwest moisture gradient that is especially marked during the dry season (November-April). During this time, strong trade winds prevent the formation of Pacific convectonal storms, which account for much of the rainfall on the Pacific slope. The trade winds usually weaken in March, a consequence of the latitudinal shifting of the intertropical convergence zone. Typically in April-May, convectonal storms mark the onset of wet season on the Pacific slope. This season

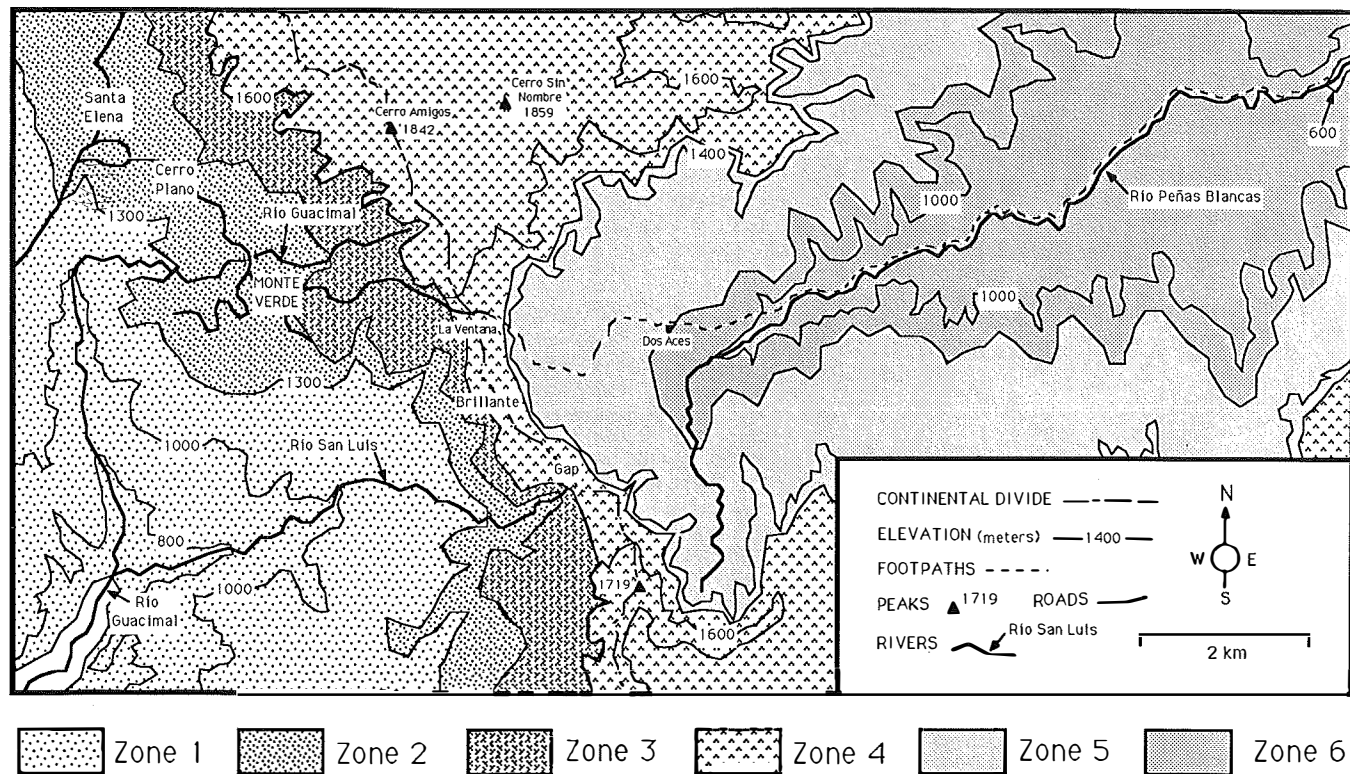


Fig. 1. Map of the Monteverde region.

usually persists until late October or early November, when the trade winds strengthen again. In contrast, the windward (Caribbean) slope has a shorter, less pronounced dry season because it receives more consistent, and often greater, moisture from the trade winds. This general seasonal pattern may vary greatly from year to year.

The northeast-southwest moisture gradient influences the structure and composition of the vegetation, resulting in a remarkable array of formations in a relatively small area. These vary from rain forest and wet forest formations on the Caribbean and upper Pacific slopes to drier moist forest formations on the lower Pacific slopes (Hartshorn 1983). From the more humid to the drier formations, epiphytes (orchids, bromeliads, mosses, etc.) decrease in abundance, the number of deciduous trees and shrubs increases, and vegetation density generally decreases. However, much variation results from differences in topography and exposure to the trade winds, and the interested reader is directed to Lawton and Dyer (1980), who describe the vegetation and its variability in the upper reaches of the area.

OBJECTIVES OF THE FIELD LIST

This list is intended as a guide to amphibians and reptiles in the field. Individuals seeking more detailed taxonomic characters are directed to the keys provided by Savage (1980) and Savage and Villa (1986), which emphasize identification of preserved material. We have attempted to provide descriptions useful to the novice as well as to those already experienced in field identification of these organisms. Users of this list can probably distinguish among general types of amphibians and reptiles present in Monteverde: salamanders, frogs and toads, lizards, and snakes. Few, however, will have had experience with caecilians, a group of infrequently observed, wormlike amphibians, of which two species are recorded from the region. We emphasize species recognition in life, using color, pattern or size, and less often, shape or behavior. We also note habitat, reproductive mode and local distribution in order to acquaint the user with the natural histories of individuals species. The nature of our descriptions and annotations is detailed in the sections that follow. In addition to the descriptions and annotations, we have provided four keys to aid in identification. These keys are dichotomous: For each pair of statements, the user must choose the alternative (a or b) that best describes the animal in question. In order to identify an amphibian or reptile, first consult the key to families (p. 11). After determining the correct family, refer to the portion of the list under that family heading. By comparing the descriptions provided, in combination with the ecological and distributional annotations, one should be able to identify most individuals. We have also provided keys to the most difficult groups: rain frogs (genus *Eleutherodactylus* : p. 18), anoles (genus *Anolis* : p. 22), and the small colubrid snakes less than 800 mm long (p. 25). A few species that are rarely

encountered and hence poorly known may prove difficult to identify. You may even find a species previously unknown from Monteverde. We encourage users to advise us of errors, omissions, or other sources of confusion so that future editions may be improved.

We list higher taxonomic categories (class through family) in phylogenetic sequence according to Savage and Villa (1986), modified for hylid frogs according to the arrangement used by Frost (1985). Where we have used subfamilial groupings, they differ from those of Savage and Villa (1986) only in the placement of the quark frog (*Eleutherodactylus melanostictus*), for which we have followed Miyamoto (1986). Genera, and species within genera, are listed alphabetically and follow Savage and Villa (1986). The exceptions are that we retain the name *Anolis* for all anoles, rather than recognize the genus *Norops*, because nomenclature for the entire group is under debate (Guyer and Savage 1986; Cannatella and De Queiroz, in press; Williams, in press) and that we recognize the names *Senticolis triaspis* (Dowling and Fries 1987) and *Nelsonophryne aterrima* (Frost 1987). We provide both a scientific name and a common name for each species. Individuals of one *Bolitoglossa* salamander resemble a known species, but probably represent an undescribed one (D. Wake, pers. comm.); it is designated by quotation marks around the specific name of its nominal look-alike.

ECOLOGICAL ANNOTATIONS

We use eleven categories to summarize habitats used by amphibians and reptiles. Patterns of microhabitat use often vary among age classes, and our annotations apply primarily to adults. Where more than one category is listed for a species, the first is usually most important, although in some cases subsequent categories are of equal importance. The categories are:

Arb - Arboreal

Br - Using Bromeliads (air plants that may store water in leaf axils)

TP - Frequents Temporary Pools

F - Fossorial (burrowing underground)

P - Using Permanent ponds

R - Riparian (along streams)

SAq - SemiAquatic (largely terrestrial, but frequenting aquatic microhabitats; used for reptiles only)

SArb - SemiArboreal (terrestrial, with a tendency to climb)

Sf - Semifossorial (active at ground level, but usually concealed by leaf litter or other debris)

Sw - Frequenting Swamps

T - Terrestrial (frequently active on exposed surfaces at ground level)

We use seven categories to characterize reproductive mode - four exclusively for amphibians, a fifth (egg-laying) exclusively for reptiles, and two for both groups. Where reproductive mode has been inferred from indirect

evidence, a small p [=probably] precedes the annotation.

AB - **Aquatic Breeder** (eggs laid in permanent or temporary water; aquatic larvae metamorphose into terrestrial juveniles)

LB - **Leaf Breeder** (eggs deposited on vegetation; larvae hatch from nest site into water; aquatic larvae metamorphose into terrestrial juveniles)

DD - **Direct Development** (eggs hatch as fully metamorphosed individuals; aquatic larvae absent; eggs are laid in moist terrestrial sites)

B - **Bromeliad or tree cavity breeder** (aquatic larvae develop in bromeliad tanks or treeholes)

E - **Egg-laying** (young are born in a shelled egg; i.e., oviparous species)

L - **Live-bearing** (young are born live; includes viviparous and ovoviviparous species)

U - **Unknown reproductive pattern**

DISTRIBUTIONAL ZONES

The complex patterns in microgeographic distribution at a tropical locale of the dimensions covered by this list defy simple description. Zonation reduces this description to manageable units. Six distributional zones, defined roughly by elevation and topographic discontinuities, are indicated on the centerpiece map (Fig. 1). Distribution of each species is indicated by zone number(s). An underlined zone number indicates that a species has been recorded no more than twice in a zone or that the species enters that zone only marginally. Although the amphibians and reptiles in a given zone are not a discrete assemblage, zonal boundaries do correspond to areas of greatest change in species composition as one follows an east-west transect through the region. This pattern parallels that of the bird fauna (Law and Fogden 1981). The six distributional zones correspond roughly to life zones defined by Holdridge (1967) on the basis of mean annual temperature and rainfall. Tosi (1969) mapped Holdridge's life zones for Costa Rica, and Hartshorn (1983) described more precisely the extent of their areas in parts of the Monteverde region. The Holdridge life zones are listed in parentheses after each zone description.

Zone 1 - The San Luis and Guacimal valleys from the juncture of the San Luis and Guacimal rivers [690 m] to just above the top of the cliff along the lower edge of the Monteverde "plateau" [≈1300 m] (Tropical Moist Forest and Tropical Moist Forest, premontane belt transition).

Zone 2 - The Monteverde "plateau" from just above the cliff edge [≈ 1300 m] through the upper Monteverde community [≈ 1470 m]. This includes the communities of Santa Elena, Cerro Plano and the majority of Monteverde (Tropical Premontane Wet Forest).

Zone 3 - The upper Monteverde community and the lower levels of the Monteverde Cloud Forest Preserve [between ≈ 1470 and 1600 m]. This includes the vicinity of the Monteverde Cloud Forest Preserve field station

as well as a major portion of the lower western reaches of the Preserve (Tropical Lower Montane Wet Forest).

Zone 4 - The upper levels of the Monteverde Cloud Forest Preserve above ≈ 1600 m (but slightly lower near the Ventana) on the Pacific slope to 1450 m on the Caribbean slope. This includes the areas on both slopes bordering the Continental Divide as well as the highest peaks in the Cordillera de Tilarán, Cerro Amigos [1842 m] and Cerro Sin Nombre [1859 m] (Tropical Lower Montane Rain Forest).

Zone 5 - The upper reaches of the Peñas Blancas valley from the base of the cliff below the Ventana [1450 m] to the vicinity of Dos Aces [1150 m] (Tropical Premontane Rain Forest).

Zone 6 - The Peñas Blancas valley from Dos Aces [1150 m] to the Peñas Blancas river at the 600 m contour (Tropical Wet Forest and Tropical Wet Forest, Premontane Belt transition).

SPECIES DESCRIPTIONS

Species descriptions include some or most of the following aspects and are abbreviated as shown below.

Dorsal color and pattern; body shape; head color and pattern; color and pattern on sides; behaviors that expose any concealed colors or patterns; color and pattern on chin, throat, belly and underside of tail; color and pattern on limbs; color and pattern of juveniles; eye size, pupil shape, iris color; size in millimeters.

Some features are particularly diagnostic in certain genera in which species recognition is otherwise difficult. These include color and pattern of the posterior thigh in the frog genera *Eleutherodactylus* and *Rana*, wart and bony head (cranial) crest patterns of toads (*Bufo*), bone color and appearance of the heart and intestines in the translucent glass frogs (*Centrolenella*), throat fan (dewlap) color and pattern in anoline lizards (*Anolis*), and head and belly colors and patterns in the small snakes of the genera *Geophis*, *Rhadinaea*, *Tantilla*, and *Trimetopon*. Except for a few rare species, descriptions are based entirely on individuals from the Monteverde region.

Size refers to total length in caecilians and snakes (assuming an unbroken tail), and body length (snout-vent) in salamanders, frogs and toads, and lizards (Fig. 2). We list the approximate known maximum size for each species.

LIST LIMITATIONS

Because our work and that of others has focused on the Monteverde plateau (zones 2 and 3) and the upper Monteverde Cloud Forest Preserve (zone 4), species enumeration is most complete in these zones. Information on geographic (including elevational) distribution of Costa Rica amphibians and reptiles (Savage and Villa 1986; Savage, pers. comm.) suggests that

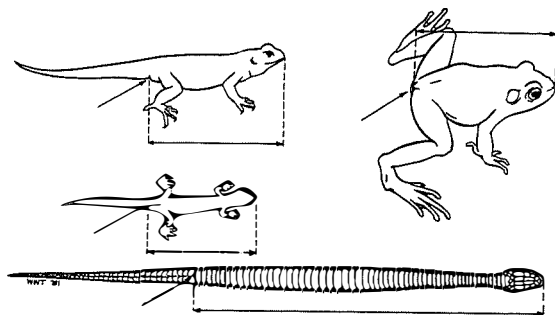


Fig. 2. Body length measurement in frogs, lizards, salamanders, and snakes; single -headed arrow denotes the cloaca (vent).

over 90% of the species present in these three zones have been recorded. In contrast, these same data suggest that many species remain unrecorded from zones 1, 5, and 6, with perhaps as many as 40% of the species remaining to be recorded from zone 6. Bias exists against recording canopy-dwelling species (e.g., *Hyla fimbriembra*, *Anolis insignis*), litter-dwelling species, especially small snakes (e.g., *Trimetopon* spp., *Tantilla* spp.), nocturnal, arboreal snakes (e.g., *Imantodes inornatus*, *Sibon* spp.), and species that probably occur only in the zones more remote from Monteverde (e.g., turtles, expected but unknown in zones 1 and 6). We encourage readers to consider this bias and attempt to improve our knowledge in these areas.

OBSERVATION OF AMPHIBIANS AND REPTILES

Several factors make amphibians and reptiles difficult to observe. Many species are secretive and probably spend the majority of time concealed in subterranean, leaf-litter or arboreal retreats. Except for golden toads (*Bufo periglenes*), harlequin frogs (*Atelopus varius*), and some brightly patterned snakes (e.g., *Erythrolamprus bizonus*, *Micrurus nigrocinctus*, *Pliocercus euryzonus*, *Scaphiodontophis venustissimus*, *Scolecophis atrocinctus*), most match the color of their environments, making detection difficult. Even these brightly colored species can be cryptic under some lighting and background conditions. Further, except for most frogs, amphibians and reptiles cannot be tracked or identified by their calls as can birds.

Nevertheless, patience and a knowledge of activity periods can result in rewarding observations. Inexperienced observers find many encounters to be momentary glimpses of animals that escape unidentified. Only by patiently developing search images can one observe amphibians and reptiles in their leaf-litter or arboreal microhabitats without disturbing them. Once one has developed this skill, field treks become more rewarding and include observations of less common species.

Knowledge of activity periods will increase the probability of encountering the species that one wishes to observe. Exact activity periods for most species are unknown, yet enough is known of general activity patterns of major groups to serve as an initial guide. Adults of salamanders and most frogs are nocturnal and many can be observed at night with a headlamp. Exceptions include harlequin frogs (*Atelopus varius*) and golden toads (*Bufo perigrinus*), which are active by day. Scattered observations indicate that juveniles of many frog species, including those with nocturnal adults, are at least partly diurnal. Activity patterns of the two local species of caecilian are not known. Unlike most of the amphibians, lizards and most snakes at Monteverde are diurnal. Exceptions include the green rat snake (*Senticolis triaspis*), the collared snake (*Enallius sclateri*), the gray earth snake (*Geophis brachycephalus*), the tree snakes (*Imantodes* spp.), the cat-eyed snake (*Leptodeira septentrionalis*), the wood snake (*Ninia psephota*), and pit vipers (*Bothriechis* spp. and *Bothrops asper*), which are mostly crepuscular or nocturnal. Additionally, the lunar (moon) cycle may modify the activity of nocturnal forms. Although little information is available on the latter, nocturnally active species seem to reduce their activity during the interval around full moon.

Weather conditions also modify activity. Salamanders and most frogs are more active on wet nights, but heavy rain may depress activity in some species. Too little is known of nocturnal snakes to suggest how activity patterns are affected by weather, but most diurnal snakes and lizards appear to be more active under sunny conditions. Seasonal changes in weather also affect the activity of amphibians and reptiles. Some species, including many treefrogs (Hylidae), most glass frogs (Centrolenidae), and rain frogs (Leptodactylidae) breed during the rainy season and are encountered infrequently during the dry season. Others, such as some riparian species (e.g., stream frogs [species of *Hyla* in the *uranochroa* group]), may breed during that time. Golden toads are highly seasonal and display one or two breeding periods of just a few days each during the transition from dry season into wet season. By choosing the correct season, time of day, weather conditions, and habitat, one can improve the probability of locating and observing a particular species. The probability of success can be further enhanced through a knowledge of details of microhabitat preferences and other species-specific behaviors.

VENOMOUS SNAKES

Monteverde, which in comparison to lowland Costa Rica, has fewer species and individuals of venomous snakes, offers a respite to the snake-wary. Four species of pit vipers are recorded for the region. The most impressive and perhaps best-known is the fer-de-lance (*Bothrops asper*), which is found at lower elevations on both sides of the Cordillera (zones 1 and 5, 6). Three smaller species (*Bothriechis lateralis*, *B. nigroviridis*, and *B. schlegelii*) are known from the vicinity of the Monteverde community and Cloud Forest Preserve (zones 2, 3, and 4), but these species are non-aggressive and encountered infrequently. Generally inactive, they remain inconspicuous most of the time. *Bothriechis schlegelii* is really a lowland form known in our area primarily from zones 1 and 6. Its occurrence in Monteverde (zone 2) is based on a single snake that was almost certainly imported with bananas. Besides the pit vipers, coral snakes (*Micrurus* spp.) are the only other dangerously venomous snakes recorded from the region. These species are common, but typically attempt to flee when approached and are unlikely to bite unless handled. In short, the Monteverde visitor can walk without the anxiety of frequently encountering dangerous snakes.

Pit vipers all have fangs at the front of their upper jaw. The fangs are folded against the roof of the mouth until erected during a strike. The four pit vipers known from the Monteverde region produce a venom that destroys blood and associated tissues. Although the primary purpose of erectile fangs and venom is to secure food, pit vipers will strike in defense if they feel threatened by close approach. The coral snake also has anteriorly positioned fangs, but these are smaller, permanently erect, and deliver a venom which attacks the nervous system. In the species list, a dagger (†) indicates a venomous snake.

In addition to these "front-fanged" snakes, 23 "rear-fanged" species occur in the area. These species use relatively weak venoms delivered by the enlarged teeth in the back of the upper jaw to immobilize their prey. Some rear-fanged species are small (e.g., *Tantilla*), so biting a human is, at best, difficult. Among the larger rear-fanged species, some (e.g., *Imantodes*) are unwilling to bite in self-defense. Even species willing to bite (e.g., *Erythrolamprus*, *Leptophis*) are not adept at envenomating a human, and the effects of a bite are purportedly mild, barring allergic reactions. Still, large rear-fanged species should be handled with caution. In the species list, an asterisk (*) indicates rear-fanged species.

FIELD KEY TO THE FAMILIES OF ADULT AMPHIBIANS AND REPTILES OF THE MONTEVERDE REGION

- 1a) **Without** visible scales; skin usually moist or mucous covered.....(Class Amphibia) 2
- b) **With visible scales**; skin dry.....(Class Reptilia) 9
- 2a) **Without** limbs; **ringed** and banded **with** distinct **pleats** (annuli: Fig. 3), suggesting a large earthworm; skin moist.....Family Caeciliidae (Order Gymnophiona; only recorded caecilian family).....Page 29
- b) **With limbs**; sometimes with side pleats, but these **not** ringing body, not suggesting a large earthworm; skin moist, less frequently dry.....3
- 3a) **With a tail**; **small**, **similar-sized** front and hind **limbs**, hind limbs **not** modified for jumping; **tiny groove** (nasolabial groove) present **between** each **nostril** and **lip**.....Family Plethodontidae (lungless salamanders; Order Caudata; only recorded salamander family).....Page 29
- b) **Without** a tail; **limbs** relatively large, **hind limbs** larger than front limbs, **modified for jumping**; **no** groove between each nostril and lip(Order Anura: frogs and toads) 4

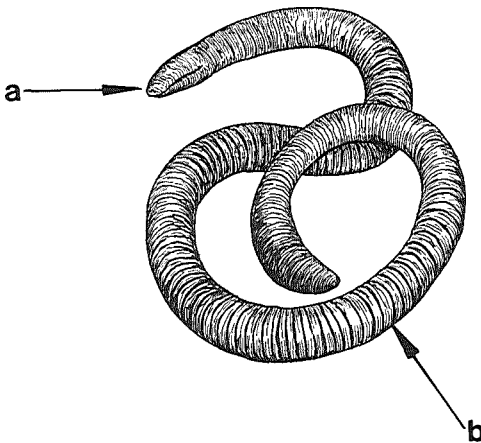


Fig. 3. Caecilian: a. head and b. annulus (body pleat).

- 4a) Often with distinct **enlarged poison glands** (parotoid glands) behind each eye (Fig. 17); **if without enlarged glands, upper surfaces** of body **brightly colored** yellow, green or blue on black or a mix of these colors, and adults and juveniles day-active.....
.....Family Bufonidae (true toad and allies) Page 35
- b) **No** poison glands behind each eye; **bright coloration**, if present, **limited to rear surfaces of thighs** (often hidden when frog is at rest) or **undersurfaces of body**; adults typically night active, juveniles may be day active.....5
- 5a) A distinct **crease or fold** present just behind eyes (Fig. 4); **eyes small**, iris **black**; **stubby, squat body** shape; rear surfaces of thighs and undersurfaces of body **not** brightly colored (browns and blacks); explosive breeders, many appear after rains fill temporary pools.....
.....Family Microhylidae (narrow-mouthed "toads" and allies) Page 30
- b) **No** crease or fold present just behind eyes; **eyes large**, iris variously colored, but **not** small and black; **body more elongate**, variously shaped, but **not** squat or stubby; rear thigh surfaces or undersurfaces of body may or may not be brightly colored; explosive or extended breeders, found in all habitats.....6
- 6a) A distinct **ridge or fold** (dorsolateral fold) **between each eye and vent** (Fig. 5Bd); **rear surfaces of thighs** or **undersurfaces of body** **brightly colored** (reds and yellows); ground-dwelling frogs of permanent streams and ponds.....Family Ranidae (true frogs) Page 41
- b) **No** dorsolateral fold; rear surfaces of thighs or undersurfaces of body may or may not be brightly colored; ground-dwelling or arboreal frogs found in various habitats.....7

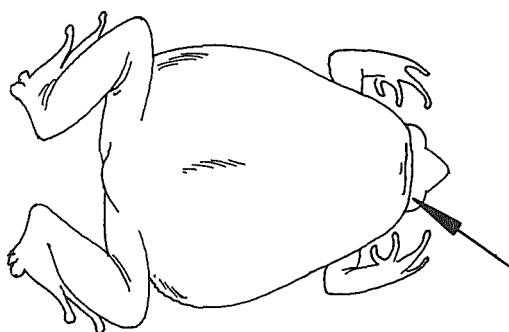


Fig. 4. Generalized microhylid frog showing stubby, squat body shape and skin fold between eyes (arrow).

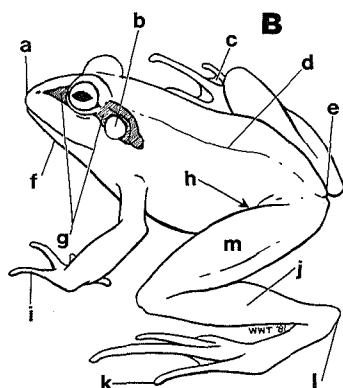
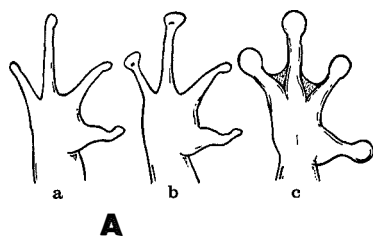


Fig. 5. A. Variation in frog hands: a. no disks, b. discs on only two digits, and c. fully disked fingers with webbing (stipple). B. Frog external anatomy: a. snout, b. tympanum (eardrum), c. webbing, d. dorsolateral fold, e. cloaca (vent), f. throat, g. mask, h. groin, i. finger, j. calf, k. toe, l. heel, and m. thigh.

- 7a) **Translucent appearance**, green or yellow-green in color; **eyes face mostly forward** (large binocular overlap: Fig. 6b); body size small (not larger than 35 mm); along streams, often on leaves.....
.....Family Centrolenidae (glass frogs: Fig. 20) Page 40
- b) **Not translucent** in appearance, brown, black, yellow or green in color; **eyes face mostly toward each side** (small binocular overlap: Fig. 6a); bodysize variable (often larger than 35 mm); in many habitats, sometimes on leaves.....8
- 8a) **Skin crease or fold lines sides and rear of belly** (ventral disk: Fig. 7); with or without expanded finger and toe disks; if present, large finger disks flattened-triangular (Figs. 5Ab, 12, 16a), triangular and pointed, or rarely oval; body shape usually rounder, limbs more robust.....
.....Family Leptodactylidae (rain frogs and allies) Page 30
- b) **No crease lines belly edges**; expanded finger and toe disks always present; large, round or oval finger disks (Fig. 5Ac), **not** triangular and pointed, or heart-shaped; body shape usually more elongate, limbs more spindly, less robust.....Family Hylidae (treefrogs: Figs. 18,19) Page 36

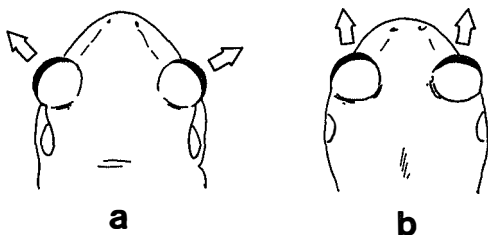


Fig. 6. Orientation of eyes in typical hyloid (a) and centrolenid (b) frogs.

- 9a) **With external limbs; moveable eyelid; ear opening present**.....
(Order Sauria: lizards) 10
- b) **Without visible limbs; no moveable eyelid, a fixed, transparent scale (brille) covers eye; no ear opening**.....(Order Serpentes: snakes) 14
- 10a) **Limbs relatively small; scales semicircular (cycloid)** (Fig. 8ab);
 secretive, infrequently exposed, many are weak climbers.....11
- b) **Limbs relatively large; scales variable: granular, squarish or rectangular, or pointed and keeled** (Fig. 8cdef), but **not** semicircular; many highly visible, frequently exposed, many are strong climbers.....12



Fig. 7. Leptodactylid frog showing ventral disk (arrow).

- 11a) **Scales of back, belly and tail smooth** (Fig. 8a), often in leaf litter
Family Scincidae (skinks) Page 47
- b) **Scales of back with fine, parallel ridges** on each scale (Fig. 8b), belly
 scales smooth; some have prominent ridging on tail scales; often in low,
 thick vegetation....Family Anguidae (alligator lizards and allies) Page 47
- 12a) **Belly scales large, squarish or rectangular** (Fig. 8d); scales of back
 and belly often dissimilar, less frequently similar.....13
- b) Belly scales variable, but **not** squarish or rectangular; scales of back and
 belly usually similar; scales of back fine-granular or rarely pointed and
 keeled (Fig. 8cef); many with extendable throat fan (dewlap: Figs. 9Ac,21);
 many visible, day-active species, some attaining very large sizes
Family Iguanidae (iguana lizards) Page 42
- 13a) **Distinct rings of enlarged scales encircle tail (whorls)**; scales of back
 small, granular, interspersed with rows or groups of larger, often keeled
 scales; secretive forms, in leaf-litter or low in complex tree-
 trunks.....Family Xantusiidae (night lizards) Page 47
- b) **No distinct rings of enlarged scales encircling tail**; scales of back variable;
 fine-granular, squarish, or keeled rectangular, sometimes interspersed
 with large scales; some visible, very agile, day-active species and some
 secretive leaf-litter and arboreal forms.....
Family Teiidae (whiptails and allies: Fig. 22) Page 46

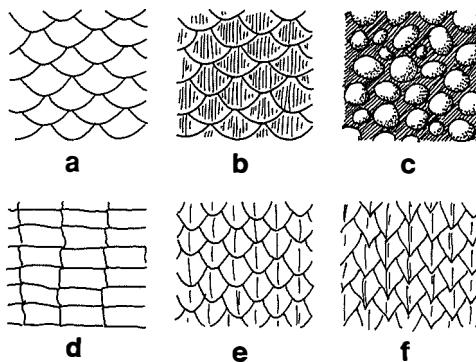


Fig. 8. Scale types: a. cycloid, b. cycloid with fine ridges, c. granular, d. squarish or rectangular, e. keeled, and f. pointed and keeled.

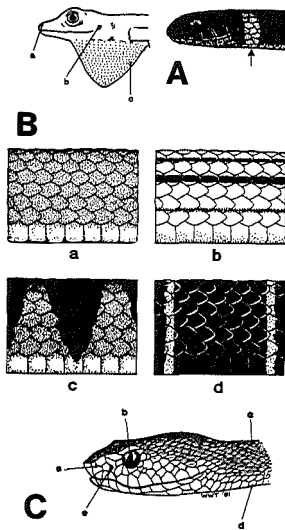


Fig. 9. A. Anole head: a. nostril, b. ear, and c. dewlap; snake with well-developed collar (arrow). B. Body color patterns of snakes: a: uniform, b. stripes, c. bands (do not encircle body), and d. rings (encircle body). C. Pit viper: a. nostril, b. vertical pupil, c. keeled dorsal scales, d. belly scales, and e. facial pit (heat sensory).

- 14a) **Belly and back scales similar-sized; eyes reduced** to small dark spots covered by scales (Fig. 10); body size small (<500 mm); **tall** reduced to **a nubbin**.....Family Typhlopidae (blind snakes) Page 48
- b) **Belly scales** at least **six times as large as back scales** (Fig. 11); **eyes well-developed, not** reduced to small dark spots covered by scales; body size variable; when unbroken, tail **not** a nubbin.....15
- 15a) **Heat sensory pit** (hole) between eye and nostril (Fig. 9Ce); **long, moveable hypodermic fangs** located toward the front of the mouth (**VENOMOUS**); scales keeled (Fig. 8e); small-to-large sized.....
.....Family Viperidae (vipers: Fig. 32) Page 61
- b) **No** heat sensory pit; **without** long, moveable, hypodermic fangs located toward the front of the mouth; scales smooth or keeled; small- to very large-sized.....16

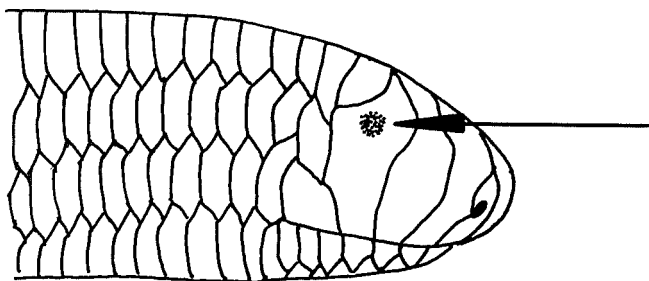


Fig. 10. Blind snake head showing eye (arrow).

- 16a) **Many** (>20) **small scales on top of head**; pupil vertical in bright light (Figs. 9Cb, 25, 32); body shape moderately to very robust; tail short (less than 1/4 of body length); scales smooth; may attain very large size (to 5.5 m).....Family Boidae (boas) Page 48
- b) **Few** (<12) **large scales on top of head**; pupil round (Figs. 23, 26-30), rarely vertical; body shape very slender to robust; tail variable length; scales smooth or keeled; small- to large-sized (to 3 m.)17
- 17a) Various colored, but except for *Scaphiodontophis venustissimus* (p. 57), if tricolored (red, black, and yellow or white rings or bands), then red rings or bands not separated from black rings or bands (Figs. 23, 26); **no** enlarged fangs at front of mouth; eyes small to large; scales smooth or keeled or both; body size very small to very large (up to 3 m.)Family Colubridae (colubrid snakes: Figs. 23-30) Page 48
- b) Color either red and black, or tricolored (red, black, and white or yellow) rings; if tricolored, black rings always separated from red rings by white or yellow (Fig. 31); **short**, but enlarged, **immovable fangs** located toward the front of the mouth (**VENOMOUS**); eyes small and black; scales smooth; body size under 1 m.....Family Elapidae (corals, cobras, and allies)Page 60

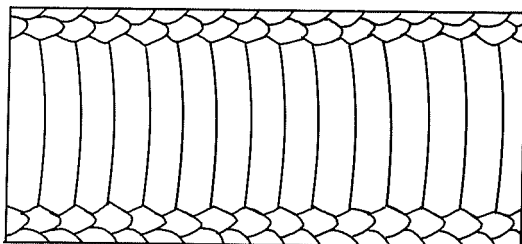


Fig. 11. Enlarged snake belly scales.

FIELD KEY TO THE RAIN FROGS (GENUS *Eleutherodactylus*) **OF THE MONTEVERDE REGION**

- 1a) **Some webbing**, even if very little, between toes..... 2
- b) **No toe webbing**.....8
- 2a) **Weakly enlarged** finger and toe **disks**, disks not greater than 1.5 times width of digit below disk, disks on outer two fingers only slightly, if at all, larger than disks on inner two fingers; back gray to brown, often with raised darkened areas that give warty appearance, sometimes with narrow, middorsal stripe; large body size; stocky, short-legged; ground-dwelling, mostly restricted to stream borders..... 3
- b) **Strongly enlarged** finger and toe **disks**, disks on outer two fingers at least twice width of digit below disk (Fig. 12); posterior thigh variously colored; very small to large body size; less stocky, body longer and relatively long-legged; largely arboreal, may or may not occur along stream borders.....4

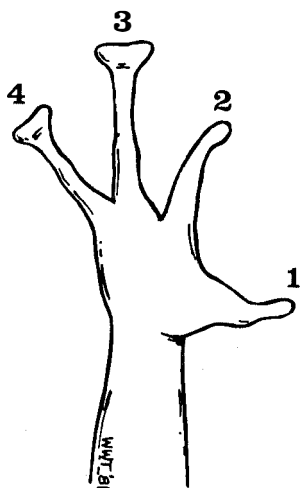


Fig. 12. Hand of rain frog (*Eleutherodactylus* sp.) showing expanded disks on fingers III and IV.

- 3a) **Posterior thigh dirty brown with many (≥ 20), wormlike, cream to pale yellow spots**; undersurfaces of lower belly and hind limbs yellow, often suffused with some red or orange, some individuals with extensive areas of tomato red pigment (to 85 mm).....Tilarán Rain Frog (*Eleutherodactylus angelicus* : Fig. 15b) Page 34
- b) **Posterior thigh dirty brown with several (< 20) distinct, round to oval, yellow spots**; undersurfaces of lower belly and hind limbs bright yellow, but lacking red or orange pigment (to 93 mm).....Lowland Rain Frog (*Eleutherodactylus rugulosus*) Page 34
- 4a) **Thigh bars extend to back of thigh** so anterior and posterior thigh are similarly patterned; weak eyelid (supraocular) tubercles..... 5
- b) **Thigh bars restricted to front of thigh** so anterior and posterior thigh are differently patterned..... 6
- 5a) **Posterior thigh with yellow spots or vertical stripes** as bar inter-spaces; posterior undersurfaces yellow suffused with pink; moderately small body size (to 48 mm); back uniform dark brown with few dark spots.....Monteverde Rain Frog (*Eleutherodactylus cuaquero*) Page 33
- b) **Posterior thigh with transverse bars that alternate with light areas ranging from green and yellow-green to magenta and scarlet**; moderate body size (to 56 mm); back beige to black, variously marked with green, yellow-green, yellow, magenta or scarlet.....Quark Frog (*Eleutherodactylus melanostictus* : Fig. 16) Page 33
- 6a) **Posterior thigh uniform orange- or rust-brown**; dorsum uniform brown with few dark spots on shoulder, infrequently with broad, pale yellow stripe and even less frequently with narrow, pale yellow stripe; undersurfaces light cream; moderately small body size (to 45mm) ...Slim-fingered Rain Frog (*Eleutherodactylus crassidigitus* : Fig. 15c) Page 32
- b) **Posterior thigh with varying-sized, yellow spots, not uniform-colored**; moderately small to large body size (to 95 mm)..... 7
- 7a) **Posterior thigh dark chocolate brown with few, discrete, bright, sun-yellow spots**; back dark brown with purplish cast, frequently with narrow, pale yellow stripe; posterior belly and undersides of lower limbs salmon-red, bright yellow, or orange in juveniles; large body size (to 95 mm).....Salmon-bellied Rain Frog (*Eleutherodactylus andi*) Page 32
- b) **Posterior thigh medium brown with many, small, wormlike, pale to bright yellow spots**; back beige to brown, without purplish cast, but frequently with broad, yellow stripe; moderately small body size (to 52 mm).....Common Rain Frog (*Eleutherodactylus fitzingeri*) Page 33
- 8a) **Strongly enlarged toe and finger disks**, disks of longest finger (3rd) 1.5 to three times width of digit below disk; undersides of hands and feet not darkly counter-colored; **no** dark triangular “trouser” patch around vent; primarily arboreal frogs..... 9

- b) **Barely enlarged toe and finger disks**, disk of longest finger less than 1.5 times width of digit below disk; undersides of feet and sometimes hands darkly counter-colored; **dark triangular “trouser” patch around vent**; primarily terrestrial frogs.....15
- 9a) **Terminal edge of disk of longest finger (3rd) flattened or low-rounded at tip**, sometimes with an indentation in middle of disk edge (emarginate); body size very small to moderately small (to 56 mm).....10
- b) **Terminal edge of disk of longest finger pointed or angular at tip**, without edge indentation; body size very small (to 27 mm).....13
- 10a) **Terminal edge of finger and toe disks oval, low-rounded in outline**; very small body size (to 26 mm).....11
- b) **Terminal edge of finger and toe disks flattened in outline**, appearing as inverse triangles (tip points towards the digit); small to moderately small body size.....12
- 11a) **Heel tubercle (calcar) present**; **back** pale yellow, pinkish, brownish, or gray **with dark dots**; front and back surfaces of lower limbs **not** orange to red to 26 mm.....
.....**Leaf-breeding Rain Frog (*Eleutherodactylus caryophyllaceus*)** Page 31
- b) **No heel tubercle**; **back** uniform yellow to beige; **front and back surfaces of lower limbs orange to red**; to 25 mm.....
.....**Pygmy Rain Frog (*Eleutherodactylus ridens*)** Page 31
- 12a) **Distinct eyelid bumps** (supraocular tubercles); back beige to brown; **lower leg edged with series of pointed tubercles**; usually one to several bright yellow to orange spots in groin and on anterior thigh; posterior thigh dark brown or black often with some yellow spots; small body size (to 38 mm).....
.....**Golden-groined Rain Frog (*Eleutherodactylus cruentus*)** Page 31
- b) **Weak eyelid bumps**; back beige to black, variously marked with green, yellow-green, yellow, orange, magenta, or scarlet; **no** pointed tubercles along lower leg; **no** yellow or orange spots on groin or anterior thigh; anterior and posterior thighs with dark transverse bars that alternate with light areas ranging from green and yellow-green to magenta and scarlet; moderately small body size (to 56 mm).....
.....**Quark Frog (*Eleutherodactylus melanostictus* : Fig. 16)** Page 33
- 13a) **Dark brown to black with light coral spots** in groin and on anterior thighs; **thighs and calves with some discrete, pale blue spots**; very small body size (to 27 mm).....
.....**Coral-spotted Rain Frog (*Eleutherodactylus altae*)** Page 31
- b) Pink, brown, or gray **without** coral spots in groin and on thighs, and pale blue spots on thighs and calves.....14

- 14a) **Venter pink**; usually uniform pink or brown dorsum suffused with red; very small body size (to 25 mm).....
Montane Dink Frog (*Eleutherodactylus hylaeformis*) Page 31
- b) **Venter white to yellow**; usually substantial pattern on gray to brown background; very small body size (to 24 mm).....
Common Dink Frog (*Eleutherodactylus diastema*) Page 31
- 15a) **First finger longer than second; head broad**, width >45% of body length; adults and all but smallest juveniles **with bony projections** (cranial crests) best developed toward back of head and between eyes; **undersurfaces** of abdomen and lower limbs usually **covered by distinct** white, yellow, orange or red **spots on dark** brown to black field; large body size (up to 110 mm).....
Broad-headed Rain Frog (*Eleutherodactylus biporcatus*) Page 30
- b) **First finger subequal to second; head narrow**, width less than 45% of body length, **no** cranial crests; **undersurfaces** of abdomen and lower limbs **not light-spotted** on dark field; small body size (less than 40 mm).....16
- 16a) **Back appears rough due to scattered wartiness**; often with a mottled pattern; **tubercles on undersides of hands elevated and distinct**; small body size (to 30 mm).....
Bransford's Litter Frog (*Eleutherodactylus bransfordii*) Page 34
- b) **Back appears smooth due to limited wartiness**, infrequently mottled pattern more often nearly uniform dark brown; **tubercles on undersides of hands low and rounded**, indistinct; small body size (to 35 mm).....
Piglet Litter Frog (*Eleutherodactylus podiciferus* : Fig. 15a) Page 34

FIELD KEY TO THE ANOLES (GENUS *Anolis*) OF THE MONTEVERDE REGION

- 1a) **Large adult body size (> 100 mm); capable of striking color change from bright leaf green to darker green, gray-green, brown or tan, without middorsal stripe of contrasting color; tongue yellow**..... 2
- b) **Small to moderately large adult body size (<100 mm); capable of color change, but not from green to brown, mainly involves lightening and darkening, which can obscure markings, females often with middorsal stripe of contrasting color; tongue pink or dark colored**..... 3
- 2a) **Distinct dark ring or spot between ear and shoulder; changeable from bright leaf green with black and white spots to tan brown with dark brown and white spots; very large adult body size (to 160 mm); body scales smooth and rounded, oval or hexagonal; dewlap of male with horizontal orange or red and green bars interspersed with white bars and dark spotting, rarely solid orange or red with greenish margin; males with enlarged postanal scales**.....
.....Giant Banded Anole (*Anolis insignis*) Page 43
- b) **No dark ring or spot between ear and shoulder; changeable from bright leaf green with dark-rimmed, pale blue spots or bands to dark brown with prominent white and black spots or bands; adult body size less than 120 mm; scales keeled with some belly scales spine-tipped; dewlap of male (Figs. 9Ac or 21) moderate-sized, pastel chalk blue with a broad free margin, red-orange anteriorly to yellow-orange posteriorly; males without enlarged scales at base of tail behind vent (postanal scales)**.....Green Tree Anole (*Anolis biporcatus*) Page 42
- 3a) **Iris metallic blue; moderately large body size (to 100 mm); brown, light to dark olive or gray, often with brick-red suffusion and dark green or brown bands with numerous small dots; dewlap of male pink-orange, olive-green or black**.....Blue-eyed Anole (*Anolis woodi*) Page 44
- b) **Iris coppery brown, coppery or gold, but not metallic blue; body size small to moderately large; colored gray, gray-tan, beige, yellowish, brown or black; dewlap of males variously colored**..... 4
- 4a) **With or without light stripe on each side; moderately large adult body size (to 96 mm)**..... 5
- b) **No light stripe on each side, variously colored; small to moderate-sized adult body size (to 60 mm)**.....6
- 5a) **Distinct light stripe on each side from the neck to at least the mid-trunk, dark brown, often with olive cast and overlain with darker bands; moderately large body size (to 95 mm); dewlap of male burnt orange**.....
.....Stream Anole (*Anolis oxylophus*) Page 43

- b) **Without** distinct light stripe, variably colored from greenish-yellow to greenish-brown, often with lichen-like mottling, with or without middorsal stripe; moderately large size (to 96 mm); **dewlap of male uniform greenish yellow**.....Pug-nosed Anole (*Anolis capito*) Page 42
- 6a) **Tube-like pocket** opening through small hole **beneath each forelimb** (axillary pocket); **band of enlarged, ridged (keeled) scales, 7-12 scale rows wide down middle of back** that contrasts sharply with small scales on sides (Fig. 13); small body size (to 41 mm); **dewlap of male red-orange with narrow, bright-yellow free margin**; males without postanal scalesGround Anole (*Anolis humilis*) Page 43
- b) **No tube-like forelimb pockets**; scales on middle of back, if enlarged, grade imperceptibly into smaller scales on sides, **not** as broad band of markedly enlarged scales; body size small to moderate (to 60 mm); dewlap white, orange, pink, yellow, burgundy, plum, blue, purple or a combination of two of some of these, but **not red-orange with bright yellow margin**; males with or without postanal scales..... 7
- 7a) Gray, brown or cream, capable of turning nearly black, often with lichen-like mottling, females frequently with pale yellow or white middorsal stripe; **enlarged, elevated, solitary whitish scales on lower sides give peppered appearance**; moderately small body size (to 53 mm); dewlap of male ivory or bone white; male with postanal scales..... Gray Lichen Anole (*Anolis intermedius*) Page 43
- b) Yellowish, gray-tan, gray-brown, olive-brown, brown or black, without lichen-like pattern, **no enlarged, elevated, solitary whitish scales on lower sides**; small to moderate body size (to 60 mm); dewlap variously colored; males with or without postanal scales..... 8

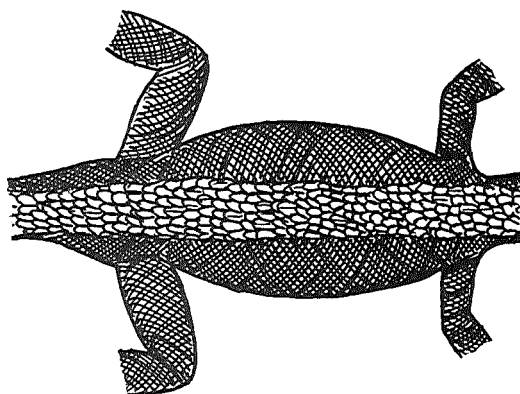


Fig. 13. Rows of enlarged dorsal scales on *Anolis humilis*.

- 8a) **Rich** medium to dark **brown, capable of darkening to nearly black** or lightening to gray-tan, females frequently with yellowish middorsal stripe; **sides** have **pearly** reflectance in bright light (nacreous); moderate body size (to 60 mm); **dewlap** of male **plum or dark burgundy**; males without postanal scales.....
Cloud Forest Anole (*Anolis tropidolepis* : Fig. 21) Page 44
- b) Yellowish, gray-tan, gray-brown, or olive-brown, color changeable but **not** rich brown capable of darkening to nearly black; sides lack pearly reflectance in bright light; small to moderately small body size (to 47 mm); dewlap white, rust-orange, orange and pink, or white or yellow and blue or purple, but **not** plum or burgundy; males with or without postanal scales..... 9
- 9a) Gray-brown to olive-brown, sometimes with reddish taint, females often with pale, middorsal stripe; small body size (to 42 mm), **very slender** in appearance; **dewlap** of male **bone white with faint, orange-yellow, subcentral spot**; males with postanal scales.....
Slender Anole (*Anolis limifrons*) Page 43
- b) Pale-yellow, light beige, gray to brown, females often with pale, middorsal stripe; small to moderately small body size (to 52 mm), **not** noticeably slender (more robust) in appearance; dewlap of male rust-orange and pink, rust-orange, or white or yellow and blue or purple, but **not** bone white with orange-yellow spot; males with or without postanal scales.....10
- 10a) Pale yellow, light beige to brown or rust with small, rectangular spots, x-shaped saddles, or middorsal stripe; moderately small body size (to 52 mm); **dewlap** of male **rust-orange grading to yellow on attached margin**; males **with postanal scales**.....
Montane Anole (*Anolis altae*) Page 42
- b) Brown or gray, often with a yellow, middorsal stripe; dewlap of male not rust-orange grading to yellow on attached margin; males **without** postanal scales.....11
- 11a) Pale brown to gray, sometimes overlain with darker hourglass or butterfly-shaped markings; small body size (to 44 mm); **dewlap** of male **white to pale yellow or orange with large, central, round, bright blue or purple spot**.....Moist Forest Anole (*Anolis sericeus*) Page 44
- b) Light to dark brown, females sometimes overlain with diamond-shaped or chevron-shaped dark markings; often with dark brown blotch on shoulder; small body size (to 42 mm); **dewlap** of male **pastel rust-orange with broad, pink free margin**.....Dry Forest Anole (*Anolis cupreus*) Page 43

FIELD KEY TO THE SMALL (<800 MM) TERRESTRIAL AND SEMIFOSSORIAL COLUBRID SNAKES OF THE MONTEVERDE REGION

- 1a) **Prominent stripes, rings, or bands**..... 2
 - b) **Uniform colored** or if striped or banded, stripes or bands **not** prominent and often very faint..... 6
- 2a) **Light and dark rings or bands**..... 3
 - b) **Light and dark stripes** running the length of the body..... 4
- 3a) **Light and dark ringed**; dark rings black, light rings white or bluish white on belly and sides and bright orange on top.....
 -Harlequin Snake (*Scolecophis atrocinctus* : Fig. 29) Page 57
- b) **Light and dark banded**; tricolored (red, black and white or yellow) with the red and white (or yellow) bands always separated by black; belly bright uniform red or red-orange.....
 -Tri-colored Crowned Snake (*Tantilla annulata*) Page 58
- 4a) **One pair of white, dorsolateral stripes** on a black field; **forks of tongue** entirely **black**; belly without orange.....
 -Twin-striped Debris Snake (*Coniophanes piceivittis*) Page 49
- b) **One or two pair of yellowish or white lateral stripes; forks of tongue white**; belly and underside of tail may be bright orange..... 5
- 5a) **Belly beige, without** orange, either uniform or, infrequently, brown or black flecked; one or two pair of yellowish or white lateral stripes on a brown or gray field, if but one pair of stripes, these on the first scale row on each side above the belly scales; head darker than body; sometimes with a broad yellowish collar on neck.....
 -Long-tailed Litter Snake (*Rhadinaea decipiens*) Page 56
- b) **Belly and underside of tail uniform**, often bright, **orange, not** brown or black flecked; back with two pair of yellowish or white lateral stripes on a rich brown field.....
 -Orange-bellied Litter Snake (*Rhadinaea guntheri*) Page 57
- 6a) **Mostly gray or black**..... 7
 - b) **Mostly brown or green**.....14
- 7a) **Most body scales keeled; body triangular** in cross-section; uniform black, black with faint white crossbands, or gray with blotches or cross-bars; **belly** and underside of tail with prominent **checkered** pattern..... 8
 - b) **Most body scales smooth; body round, not** triangular in cross-section; uniform gray or black, sometimes with faint crossbands; belly and underside of tail variously colored, but **not** checkered black and white or red.....9

- 8a) **Uniform black, gray, or black with faint white crossbands; 17 scale rows on back at midbody** (Fig. 14); **pale areas of checkered belly pattern yellow or red**.....Wood Snake (*Ninia psephota*) Page 55
- b) **Gray with black or brown-black blotches or crossbars; 19 scale rows on back at midbody; pale areas of checkered belly pattern white or cream**.....Spotted Wood Snake (*Ninia maculata*) Page 55
- 9a) **Uniform gray; eyes small and black**.....10
- b) **Uniform black; eyes small or moderate-sized**.....13
- 10a) **Belly bright lemon-yellow with few black, dash-like spots; yellow on snout**.....Yellow-bellied Earth Snake (*Geophis godmani*) Page 51
- b) **Belly cream or white often with gray or brown on some scales, not bright yellow; without yellow on snout**..... 11
- 11a) **Three to five uppermost rows of back scales keeled, often faintly so**.....Hoffman's Earth Snake (*Geophis hoffmani*) Page 51
- b) **Three to five uppermost rows of back scales smooth except for some above beginning of tail in males**.....12
- 12a) **Belly with alternating white and gray bars, less frequently all gray**.....Gray Earth Snake (*Geophis brachycephalus* : Fig. 24) Page 51
- b) **Belly cream, without barring**.....
.....Ruthven's Earth Snake (*Geophis ruthveni*) Page 51
- 13a) **Belly uniform bright lemon-yellow with few, black, dash-like spots; yellow on snout; no tiny bluish white flecks on throat; no shelf-like scale above eye; snout blunt; no nape mark on neck**.....
.....Yellow-bellied Earth Snake (*Geophis godmani*) Page 51
- b) **Belly black like back, not bright lemon-yellow; no yellow on snout; tiny bluish white flecks often present on throat; shelf-like scale above eyes gives viper-like appearance; snout angular; often with yellow or brownish nape mark narrowest in the midline**.....
.....Ridge-nosed Snake (*Amastridium veliferum*) Page 48

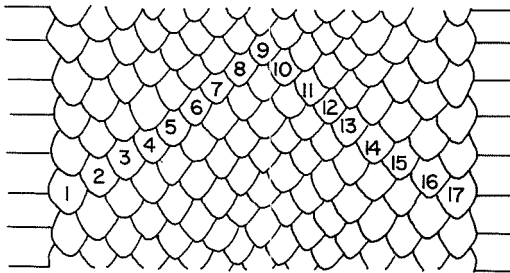


Fig. 14. Snake with 17 dorsal scale rows.

14a)	Uniform light or dark brown	15
b)	Green, brown, or beige, with some indication of faint striping	16
15a)	Red-orange to red on last one-half to one-third of belly and underside of tail, rarely with entirely beige or cream belly; faint, yellowish, band-like neck collar; throat cream, without dark pigment except on edge of lower lip	
	Red-tailed Crowned Snake (<i>Tantilla schistosa</i>)	Page 59
b)	Uniform coral-orange to orange belly and underside of tail from neck backwards; neck collar a series of small, white spots, not a faint band; throat cream speckled with dark pigment	
	Slevin's Dwarf Snake (<i>Trimetopon slevini</i>)	Page 59
16a)	Green or brown with some indication of faint striping; belly beige with each scale with small, centrally located, black triangular spot	
	Green Litter Snake (<i>Rhadinaea calligaster</i>)	Page 56
b)	Brown or beige with some indication of striping; belly cream or coral-orange with or without some flecking, but without small, centrally located triangular spot on each scale	17
17a)	Belly and underside of tail faded orange, coral orange, reddish orange, or red	18
b)	Belly beige, cream or white, but not faded or coral orange, reddish orange or red	19
18a)	Belly and underside of tail faded orange or coral orange; one, thin, black middorsal stripe and at least one narrow, but distinct white stripe on each side; throat yellowish white	
	Orange-bellied Crowned Snake (<i>Tantilla melanocephala</i>)	Page 59
b)	Belly and underside of tail reddish orange or red; two dark- bordered white or tan dorsolateral stripes that often begin as "eyespot" on each side of neck and fade into dorsal color posteriorly, no black middorsal stripe; chin and throat offwhite	
	Twin-striped Litter Snake (<i>Rhadinaea decorata</i>)	Page 56
19a)	Dark brown to black head and nape contrasts well with beige body; these separated by white collar broken at midline; thin, black, middorsal stripe present; belly translucent, iridescent white	
	Striped Crowned Snake (<i>Tantilla armillata</i>)	Page 58
b)	Head same color as body or contrasts poorly with body color; belly white, cream or orange, if iridescent, only weakly so	20
20a)	Nineteen or more scale rows on back at midbody	21
b)	Seventeen or less scale rows on back at midbody (Fig. 14)	22

- 21a) **Back** beige-brown **with weak striping**; if white on upper lips, **not** as distinct spots; **belly cream with fine black spots** arranged in **subparallel rows** towards sides of belly scales.....
.....Brown Debris Snake (*Coniophanes fissidens*) Page 49
- b) **Back** beige-brown **with narrow, but well-defined striping** ; distinct white spots edging upper lips; belly **without** spots.....
.....Striped Litter Snake (*Rhadinaea serperaster*) Page 57
- 22a) **Back with narrow, but faded striping; 17 scale rows on back at midbody; faint white spots edge upper lip**.....
.....Faded Dwarf Snake (*Trimetopon pliolepis*) Page 59
- b) **Back uniform-colored; 15 scale rows on back at midbody; no white spots edge the upper lips**..... 23
- 23a) **Faint collar**, broken in midline; **one** scale touches immediate rear border of eye.....Slender Dwarf Snake (*Trimetopon gracile*) Page 59
- b) **No collar; two** scales touch immediate rear border of eye.....
.....White-bellied Dwarf Snake (*Trimetopon simile*) Page 59

SPECIES LIST

Class Amphibia - Amphibians

Order Gymnophiona - Caecilians

Family Caecillidae	Microhabitat	Reproductive mode	Zonal Distribution
Gray Caecilian (<i>Dermophis mexicanus</i>)	F	pL	<u>56</u>
Elongate, wormlike; parallel, ringed creases over body, about twice as many per unit length on posterior half of body as on anterior half; slate gray except paler on posterior belly; eyes distinct as small black dots; sensory organ (tentacle) about halfway between eye and nostril; to 350 mm.			

Purple Caecilian (<i>Gymnopsis multiplicata</i>)	F	pL	<u>123</u>
Elongate, wormlike; parallel, ringed creases over body, about twice as many per unit length on posterior two-thirds of body as on anterior third; purplish slate except for white areas over eyes and vent; eyes not visible, roofed over by thin bone; sensory organ (tentacle) just in front of eye; to 400 mm.			

Order Caudata - Salamanders

Family Plethodontidae - Lungless Salamanders

Ring-tailed Salamander (<i>Bolitoglossa robusta</i>)	T,Arb	DD	234 6
Black with fine, white speckling, denser on belly; irregular cream to pale yellow or orange ring around base of tail; sometimes reddish on upper body surfaces; body stout and limbs relatively large; constriction at tail base; iris black; to 130 mm.			
Monteverde Salamander (<i>Bolitoglossa "subpalmata"</i>)	T,SArb,Br	DD	<u>34</u>
Dark brown or black with small spots or large blotches of brown, tan or orange; venter finely speckled with white; iris black; to 63 mm.			
Picado's Moss Salamander (<i>Nototriton picadoi</i>)	SArb,Br	DD	4
Brown with pale beige, irregular stripe extending from behind each eye to groin; another pair of fainter bands extend from back of head onto tail; undersurfaces paler brown to beige; iris brown; to 39 mm.			

Poelz's Worm Salamander	SArb,Sf	DD	4
-------------------------	---------	----	---

(*Oedipina poelzi*)
 Beige to brown contrasting with dark black belly, separated on sides by diffuse pale line; tail blacker than body; body elongate, but stouter and limbs more robust than *O. uniformis* (see below); iris black; to 74 mm.

Common Worm Salamander	Sf	DD	234
------------------------	----	----	-----

(*Oedipina uniformis*)
 Deep bluish slate; venter identically colored; head brownish; elongate with tiny limbs; limbs paler than body; tail well over twice body length when unbroken; iris black; to 64 mm.

Order Anura - Frogs and Toads

Family Microhylidae - Narrow-mouthed "Toads" and Allies

Sheep Frog	F,TP	AB	<u>123</u>
------------	------	----	------------

(*Hypopachus variolosus*)
 Gray to brown with some black spots; black eye mask with narrow, white stripe posterior and down from eye; squat with short limbs; short, but pointed snout; iris black; skin fold just behind and between eyes; to 49 mm.

Black Narrow-mouthed Toad	F	U	<u>5</u>
---------------------------	---	---	----------

(*Nelsonophryne aterrima*)
 Uniform black to slate gray; belly slightly paler; males with large ventral gland; slight webbing on toes; iris black; to 70 mm.

Family Leptodactylidae - Rain frogs and Allies

Eleutherodactylus biporcatus Species Group

Broad-headed Rain Frog	T,Sf	DD	6
------------------------	------	----	---

(*Eleutherodactylus biporcatus*)
 Tan to brown with sharply contrasting dark brown to black areas fringing eye and above the ear; hourglass-shaped folds or ridges on back often fringed with dark pigment; well-developed bony ridges on back of head and between eyes; undersurfaces of body with white, yellow, orange, or red spots on a dark-brown to black field; distinct triangular "trouser" patch around vent; undersides of feet darkly colored; iris black; to 110 mm.

Eleutherodactylus cruentus Species Group

Coral-spotted Rain Frog (<i>Eleutherodactylus altae</i>)	Arb,Br	DD	56
Beige to dark brown (nearly black) with pale blue spots under arms; groin and anterior thigh with enamel coral or orange patches; rear of thigh, undersides of lower legs, and feet with pale blue spotting; iris coppery brown; to 27 mm.			
Leaf-breeding Rain Frog (<i>Eleutherodactylus caryophyllaceus</i>)	Arb,Br	DD	6
Pale yellow, pinkish, brownish, or gray with distinct dark dots, occasionally with dark crossbars or longitudinal silver stripes; posterior thigh brown; one, small, horn-like projection over each eye; iris gold and coppery brown; to 26 mm.			
Golden-groined Rain Frog (<i>Eleutherodactylus cruentus</i>)	SArb,Br	DD	3456
Beige or light brown with reticulum of brown bars; yellow patches on groin and anterior thigh; posterior thigh yellow and brown; two to three horn-like projections over eye; two to four tiny spines along tarsus between heel and foot; iris gold and coppery brown; to 38 mm.			
Pygmy Rain Frog (<i>Eleutherodactylus ridens</i>)	SArb	DD	456
Beige-brown, yellow, or pale gold, often without any pattern; posterior thighs yellow with brown mottling; a few orange spots on thighs, calves and feet; one to three tiny horn-like projections over eye; iris beige and coppery brown; to 25 mm.			

Eleutherodactylus diastema Species Group

Common Dink Frog (<i>Eleutherodactylus diastema</i>)	Arb,Br	DD	3456
Gray to brown, usually with pattern of barring or spots; belly white or yellowish; pointed outer finger and toe disks; named for high pitched, metallic “dink” call; iris silver and brown; to 24 mm.			
Montane Dink Frog (<i>Eleutherodactylus hylaeformis</i>)	Arb,Br	DD	34
Pink to brown suffused with red, usually uniform; belly pink; pointed outer finger and toe disks; call similar to <i>E. diastema</i> (see above); iris brown; to 25 mm.			

Eleutherodactylus fitzingeri Species Group

Salmon-bellied Rain Frog	SArb,R,Br	DD	456
<i>(Eleutherodactylus andi)</i>			

Dark brown to nearly black, often with red or purplish cast; prominent, narrow, yellow middorsal stripe; posterior thigh chocolate brown with discrete, bright yellow spots and/or stripes; outer finger disks greatly enlarged; belly and undersurfaces of legs bright yellow, often suffused with salmon-orange; iris coppery-gold and brown-black; to 95 mm.

Slim-fingered Rain Frog	SArb	DD	4
<i>(Eleutherodactylus crassidigitus)</i>			

Brown with few dark markings, usually on shoulders, and less often, one or two isolated orange spots; posterior thigh reddish-brown, sometimes appearing rust or orange; lips more or less strongly barred; outer finger disks much enlarged; undersurfaces cream; iris gold and brown; to 45 mm.

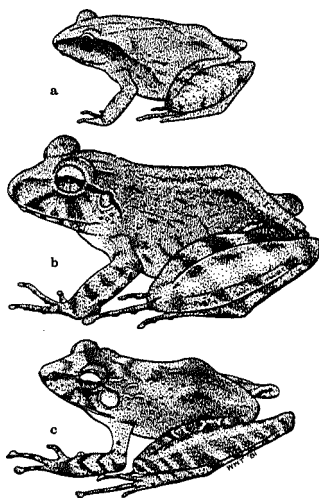


Fig. 15. Rain frogs (*Eleutherodactylus* spp.): a. *E. podiciferus*, b. *E. angelicus*, and c. *E. crassidigitus*.

Monteverde Rain Frog (<i>Eleutherodactylus cuaquero</i>)	Arb	DD	4
Dark brown, near uniform except for dark spots associated with dorsal tubercles; posterior thigh dark brown with small bright yellow spots or vertical stripes; outer finger disks greatly enlarged; posterior undersurfaces bright yellow suffused with pale rose; iris silver and brown; to 48 mm.			
Common Rain Frog (<i>Eleutherodactylus fitzingeri</i>)	SArb	DD	23 56
Beige to brown, often with moderately broad, yellow middorsal stripe; posterior thigh brown with many, wormlike, more or less fused, pale-yellow spots; throat mottled with broad white stripe; outer finger disks moderately enlarged; undersurfaces white to yellow posteriorly; iris soft gold and brown; to 52 mm.			
Quark Frog (<i>Eleutherodactylus melanostictus</i>)	Arb,Br	DD	345
Highly variable, usually brown, but variously marked with green, yellow-green, yellow, orange, pink, magenta or scarlet, often in lichen-like patterns; thighs marked with brown transverse bars that alternate with pale bars of one or more of above colors, but usually contain orange or yellow; outer finger disks greatly enlarged; iris coppery-gold and dark brown; two to three tiny, horn-like projections over eye; to 56 mm.			

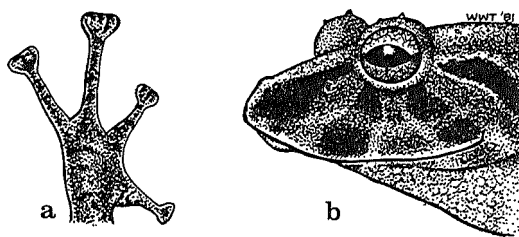


Fig. 16. Quark Frog (*Eleutherodactylus melanostictus*) : a. hand b. head.

Eleutherodactylus gollmeri Species Group

Bransford's Litter Frog	T,Sf	DD	23 56
<i>(Eleutherodactylus bransfordii)</i>			

Tan brown, beige to dark brown with highly variable pattern of spots; rugose and warty, often with ridged-X dorsal pattern, infrequently with narrow, middorsal stripe; groin often with orange suffusion; sometimes with dark mask; undersurfaces of feet dark brown, contrast sharply with paler upper surfaces; no well-developed finger and toe disks; iris brown; to 30 mm.

Piglet Litter Frog	T,Sf	DD	2345
<i>(Eleutherodactylus podiciferus)</i>			

Tan, pink, or dark brown with minimal pattern, usually few spots or warts; groin often with suffusion of orange; sometimes with dark mask; bottom of feet contrast sharply with upper surfaces; no well-developed finger and toe disks; iris dark brown with gold-green flecking; to 35 mm.

Eleutherodactylus rugulosus Species Group

Tilarán Rain Frog	T,R	DD	123456
<i>(Eleutherodactylus angelicus)</i>			

Brown to mottled brown, with much variation, often with some red or orange; posterior thigh mottled, muddy, light and dark brown; undersurfaces cream to yellow posteriorly, often suffused with red or red-orange coloration; iris gold and black; to 85 mm.

Lowland Rain Frog	T,R	DD	6
<i>(Eleutherodactylus rugulosus)</i>			

Brown to mottled brown, often with irregular black markings, with much variation; posterior thigh dirty brown with several distinct, round to oval, bright yellow spots; undersurfaces yellow to bright yellow posteriorly; iris gold and dark brown; to 93 mm.

Other leptodactylid frogs

Smoky Jungle Frog	T,F	AB	6
<i>(Leptodactylus pentadactylus)</i>			

Brown, gray-brown, gray or purplish gray, sometimes with a few black spots; posterior thigh brown or gray distinctly marbled with white or cream; undersurfaces white or cream; lips strongly barred with white and dark brown or purplish brown; iris gold-silver and dark brown; to 160 mm.

Family Bufonidae - True toads and allies

Harlequin Frog (<i>Atelopus varius</i>)	T,R	AB	123456
--	-----	----	--------

Black with highly variable pattern of orange-yellow, yellow, yellow-green, green, blue-green or blue gray blotches, spots or irregular lines; belly marbled with white, yellow, orange, orange-red or red; no finger or toe disks; slim limbs and angular body shape give cadaverous appearance; iris pale green to green; to 50 mm.

Dry Forest Toad (<i>Bufo coccifer</i>)	T,TP	AB	123
---	------	----	-----

Brown with variable pattern of darker blotches; very narrow, middorsal, white or pale yellow stripe; numerous, conical, more or less evenly spaced warts; small parotoid glands slightly larger than area of upper eyelids; undersurfaces cream mottled with brown; first finger equal to or longer than second; cranial crests absent; iris brown; to 82 mm.

Green Climbing Toad (<i>Bufo coniferus</i>)	T,SArb,TP	AB	2 456
--	-----------	----	-------

Variable, yellow-green, olive green or brown, often blotched with black and white, sometimes uniform brown with one or two gold spots; distinct, paired, lateral series of spine-tipped warts; second finger longer than first; small, very inconspicuous, triangular parotoid glands; cranial crests present; juveniles less than 30 mm usually green with prominent, light-bordered, red-orange warts; iris green and brown; to 94 mm.

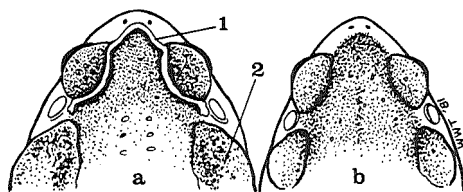


Fig. 17. Top views of toad (*Bufo* spp.) heads: a. Giant Toad, *B. marinus* showing (1) prominent cranial crests and (2) large parotoid glands, b. *B. coccifer* with no cranial crests and small parotoid glands.

Litter Toad (<i>Bufo haematiticus</i>)	T,TP	AB	6
Variable, beige to brown with paired, but irregularly placed black spots, lighter back color always contrasts sharply with the dark brown or black on sides of body and face, contrast in color emphasized by angular snout and dorso-lateral ridge; moderate-sized, oval parotoid glands; cranial crests absent; iris dark brown or black; to 80 mm.			
Giant Toad (<i>Bufo marinus</i>)	T,TP,P	AB	123
Brown, often with obscure blotches; large and small, rounded warts irregularly scattered on body; venter dirty white to cream with irregularly spaced, brown blotches; very large, triangular parotoid glands; prominent cranial crests; juveniles less than 60 mm with distinct, subparallel series of red or orange, middorsal warts; iris brown; to 190 mm.			
Wet Forest Toad (<i>Bufo melanochloris</i>)	T,TP	AB	6
Extremely variable gray-olive to tan brown often with several pairs of irregular black or dark brown spots, some more or less connected along body's long axis, coloration often has velvet-like appearance; light, median band or line sometimes present; distinct, linear series of small warts extends down each side from triangular, narrow and elongate parotoid glands; prominent cranial crests; undersurfaces beige or brownish white with chin and chest darker with lighter flecks; iris brown; to 100 mm.			
Golden Toad (<i>Bufo periglenes</i>)	T,TP	AB	4
Males uniform yellow to orange, females black with burgundy red spots surrounded by yellow; small, elongate-oval parotoid glands; cranial crests absent; juveniles less than 30 mm with faded female coloration; iris black with thin gold or coppery border around pupil; to 60 mm.			

Family Hylidae - Treefrogs

Subfamily Phyllomedusinae

Golden-eyed Leaf Frog (<i>Agalychnis annae</i>)	Arb,P,TP	LB	23456
Uniform leaf green, often with one or few white or pale yellow spots; lavender to purplish wash on upper forelimbs, flanks, anterior and posterior thighs, and calves; pink on hands and undersurfaces; webbing present on hands and feet; iris black with gold crescents at each side of vertical pupil; to 84 mm.			

Red-eyed Leaf Frog	Arb, TP,Sw	LB	6
--------------------	------------	----	---

(*Agalychnis callidryas*)

Uniform dark leaf green, often with one or a few small white or pale yellow spots; bright blue-purple upper forelimbs, flanks, anterior and posterior thighs, and calves; flanks with vertical white or pale yellow bars on blue-purple ground color; bright orange on hands and feet; iris scarlet red with vertical pupil; to 75 mm.

Lemur Frog	Arb, TP,Sw	LB	3456
------------	------------	----	------

(*Phyllomedusa lemur*)

Uniform leaf green (day color) to maroon brown or burgundy (night color) with blotched intermediate conditions with both these colors; spindly limbs and bulging eyes, cadaverous appearance; yellow upper forelimbs, flanks, anterior and posterior thighs, and calves; undersurfaces white; no webbing on digits; pupil vertical, iris gray edged by black sclera; to 51 mm.

Subfamily Hyliinae

Hyla leucophyllata Species Group

Swamp Frog	Arb,TP,Sw	AB	6
------------	-----------	----	---

(*Hyla loquax*)

Variable from uniform sun-yellow to brown; bright red or orange on webbing and posterior surfaces of thighs; iris reddish tan; to 45 mm.

Hyla miliaria Species Group

Highland Fringed-limbed Treefrog	Arb	pB	<u>4</u>
----------------------------------	-----	----	----------

(*Hyla fimbrimembra*)

Lichen-like pattern with color shift capabilities from green to brown; when green, mixed green, white, and olive; when brown, mixed brown, tan, and white; back of adults nearly smooth, some small tubercles on juveniles; distinctive scalloped, white fringes on arms and feet; webbing on hands reaches at least one finger disk; iris red-brown; to 87 mm.

Lowland Fringed-limbed Treefrog	Arb	pB	6
---------------------------------	-----	----	---

(*Hyla miliaria*)

Mottled pattern of white, brown, orange-tan, green, and some metallic green with color shift capabilities from greenish to brownish; back of adults and juveniles with many tubercles; fringes on arms and feet mottled; webbing on hands do not reach any finger disk; iris ochre-orange; to 108 mm.

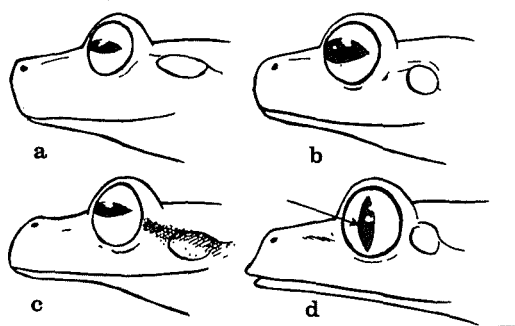


Fig. 18. Profiles of treefrog heads: a. Mountain Stream Frog, *Hyla rivularis*, showing acute snout, b. Lichen Stream Frog, *H. tica*, c. Meadow Treefrog, *H. pseudopuma*, d. Golden-eyed Leaf Frog, *Agalychnis annae* with vertical pupil (arrow).

Hyla pseudopuma Species Group

Pin-striped Treefrog (<i>Hyla angustilineata</i>)	Arb,TP,Sw	AB	34
--	-----------	----	----

Tan to brown with very narrow, white stripe from eye to groin bordered below by dark brown that becomes diffuse on sides; undersurfaces yellow peppered with brown flecks except for cream throat and belly; juveniles less than 20 mm with entire green dorsum or green edging white dorsolateral stripes; iris reddish-copper; to 38 mm.

Meadow Treefrog (<i>Hyla pseudopuma</i>)	Arb,TP,Br	AB	23456
---	-----------	----	-------

Drab beige-brown, often with obscure saddles or blotches on back, except breeding males that become brilliant sun-yellow; weak eye mask present continues as diffuse stripe on flank; yellow, rarely green, groin and flanks; yellow anterior and posterior thighs; venter cream; iris deep bronze; to 48 mm.

Hyla uranochroa Species Group

Mountain Stream Frog (<i>Hyla rivularis</i>)	Arb,R	pAB	2345
---	-------	-----	------

Yellowish tan, ivory gray to dark brown with faintly darker dorsal markings; belly cream or pale yellow with dark brown or black flecks; iris coppery; to 37 mm.

Rufous-eyed Stream Frog (<i>Hyla rufiocularis</i>)	Arb,R	pAB	12 56
Mottled green and brown; undersurfaces creamy white or pale yellow; prominent, white lip stripe that frequently expands to touch base of eye; white edging to forearm and foot; iris rufous or orange-red; to 40 mm.			
Lichen Stream Frog (<i>Hyla tica</i>)	Arb,R	pAB	234
Blotched lichen-like gray, green and white; distinct dark blotches or bars on limbs; undersurfaces cream or pale yellow with gray suffusion and few, irregularly-scattered, dark flecks; iris dull reddish-bronze; to 44 mm.			
Red-eyed Stream Frog (<i>Hyla uranochroa</i>)	Arb,R	pAB	2345
Uniform leaf green; undersurfaces yellow; prominent, white lip stripe that rarely expands to touch base of eye; white edging to forearm and foot; iris scarlet red; to 43 mm.			

Hylineae of uncertain affinities

Crowned Frog (<i>Anothea spinosa</i>)	Arb,Br	B	5
Gray-tan or brown with dark brown or purple-brown markings; lips, flanks, and thighs strongly barred; named for row of sharp-tipped, bony spines around back of head and between eyes; iris rich, dark brown with horizontal pupil; to 73 mm.			
Masked Treefrog (<i>Smilisca phaeota</i>)	Arb,TP	AB	56
Pale green to tan with dark olive-green or dark brown markings; dark mask usually present; flanks marked with dark brown or black venation; distinct white stripe on outer edge of forearm and feet; iris bronze with black reticulations; to 80 mm.			

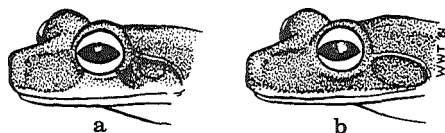


Fig. 19. Red-eyed stream frogs: a. Rufous-eyed Stream Frog, *Hyla rufiocularis*, showing lip stripe greatly expanded under eye, b. Red-eyed Stream Frog, *H. uranochroa*, with comparatively thin lip stripe.

Drab Treefrog	Arb,TP,Br	AB	1	6
<i>(Smilisca sordida)</i>				

Gray, pale tan or reddish brown, variously marked with dark gray, dark brown, purplish brown or olive-green spots or blotches; flanks are dark brown or purplish brown with cream or bluish gray spotting or mottling; iris silver or bronze with black reticulations; to 65 mm.

Family Centrolenidae - Glass Frogs

Bare-hearted Glass Frog	Arb,R	LB	234
<i>(Centrolenella colymbiphylum)</i>			

Translucent lime green with fine, pale yellow spots; red heart visible; intestines white; limb bones visible, white; hands pale yellow-green; iris gold; to 29 mm.

Cascade Glass Frog	Arb,R	LB	1
<i>(Centrolenella euknemos)</i>			

Dark green with more or less regularly-spaced, tiny, yellow spots; broken white fringe on outer forearms and feet; white tunic covers upper half of belly; intestines not white; bones visible, green; digits translucent yellow; iris beige-gold with heavy black reticulum; to 32 mm.

Fleischmann's Glass Frog	Arb,R	LB	123
<i>(Centrolenella fleischmanni)</i>			

Translucent lime green with small yellow spots; covering of the heart (pericardium) white, heart not directly visible; bones visible, white; hands translucent yellow; iris gold; to 28 mm.

Granular Glass Frog	Arb,R	LB	1	6
<i>(Centrolenella granulosa)</i>				

Translucent blue-green suffused with yellow, often with a few diffuse dark spots; skin distinctly granular; white tunic covers upper quarter of belly, lower stomach and intestines visible and white; bones visible, green; digits translucent yellow; iris pale beige-gold; to 31 mm.

Emerald Glass Frog	Arb,R	LB	123456
<i>(Centrolenella prosoblepon)</i>			

Dark emerald green with or without black spots; skin smooth; males with distinct spatulate hook on upper forearm; white tunic covers nearly all of belly, intestines not visible; bones visible, green; hands translucent pale green; iris gray-gold or beige; to 33 mm.



Fig. 20. Emerald Glass Frog, *Centrolenella prosoblepon*, showing humeral hook (arrow) found in most adult males and a few adult females.

Reticulated Glass Frog	Arb,R	LB	56
<i>(Centrolenella valerioi)</i>			

Translucent yellow-gold with green reticulum so yellow areas appear as moderate-sized, subequal, circular spots; red heart visible; intestines white; bones visible, white; digits translucent yellow; iris gold; to 26 mm.

Green-striped Glass Frog	Arb,R	LB	56
<i>(Centrolenella vireovittata)</i>			

Translucent yellow-gold with irregular, green, middorsal stripe bordered by gold and reduced reticulum so bare areas appear as small, irregular-sized spots; red heart visible; intestines white; bones visible, white; digits translucent yellow; iris gold; to 26 mm.

Family Ranidae - True frogs

Dry Forest Leopard Frog	T,P	AB	12
<i>(Rana forreri)</i>			

Green beige with metallic luster and metallic, dark-edged brown spots; spots edged in green-white, irregular and about as long as wide; thighs barred; prominent dorsolateral folds with several accessory, parallel ridges in between; posterior thigh with bold, dark reticulum; undersurfaces white and without spots; iris gold and black; to 104 mm.

Green-eyed Frog	T,TP,P,Sw	AB	34
<i>(Rana vibicaria)</i>			

Bronze-brown with prominent, dorsolateral folds; often tinges of green along dorsolateral folds; throat and belly mottled brown and white; posterior thigh red with few faint, small, black flecks; undersurfaces of limbs bright red-orange; iris green and black; juveniles less than 50 mm with entirely or partially green back; to 92 mm.

Brilliant Forest Frog	R,T,TP,P	AB	23456
<i>(Rana warschewitschii)</i>			

Golden tan or brown with variable numbers of dark green flecks, sometimes fused into irregular green patches; distinct dorsolateral folds; dark mask; venter bright yellow to orange-yellow becoming red-orange on hind-limb undersurfaces; posterior thigh dark brown with discrete, bright yellow spots; iris gold and brown to 80 mm.

Class Reptilia - Reptiles

Order Squamata - Lizards and Snakes

Family Iguanidae - Iguanid Lizards

Montane Anole	SArb	E	34
<i>(Anolis altae)</i>			

Pale yellow or light beige to brown or rust with small rectangular spots, X-shaped saddles, faint bands, or middorsal stripe; pale yellow and white ventrally, sometimes overlain with dark flecks; iris pale beige-yellow; dewlap of male rust orange grading to yellow near the attached margin; to 52 mm.

Green Tree Anole	Arb	E	1	56
<i>(Anolis biporcatus)</i>				

Changeable from uniform leaf green with dark-rimmed pale blue spots or bands to dark brown with prominent white and black spots or bands plus many mottled, intermediate conditions; throat and belly white with bluish cast; tail weakly banded, underside yellow; dewlap of male pastel chalk blue with relatively broad free margin grading from yellow-orange posteriorly to red-orange anteriorly; small, fleshy crest sometimes present; iris gold; to 115 mm.

Pug-nosed Anole	Arb	E	6
<i>(Anolis capito)</i>			

Variably colored from greenish yellow to greenish brown often with lichen-like mottling, females often with a middorsal stripe; belly cream to yellow-white; dewlap of male greenish yellow; iris coppery-brown; to 96 mm.

Dry Forest Anole (<i>Anolis cupreus</i>)	SArb	E	1
Light to dark brown, sometimes with middorsal stripe sometimes overlain with diamond-shaped or chevron-like dark markings, grading to fine mottled brown and cream on belly; often with dark brown blotch on shoulder; dewlap of male pastel rust orange with broad pink free margin; iris coppery; to 42 mm.			
Ground Anole (<i>Anolis humilis</i>)	T,SArb	E	123456
Rich dark brown, commonly with a broad, bronze middorsal stripe, sometimes overlain with a chevron pattern and often with one or more dark spots just anterior to the tail base; 7-12 enlarged scale rows middorsally; small, tube-like pocket under forelimbs; dewlap of male red-orange with narrow, bright yellow free margin; iris brown and gold-flecked; to 41 mm.			
Giant Banded Anole (<i>Anolis insignis</i>)	Arb	E	234 6
Changeable from bright green with black and white spots to tan brown with dark brown and white spots; ventral surfaces similarly colored except paler and more mottled; small, fleshy crest on neck; distinctive dark ring spot between ear and shoulder; iris brown with metallic blue edge or entirely dull metallic blue; dewlap of male with horizontal orange or red and green bars interspersed with white bars and dark spotting; to 160 mm.			
Gray Lichen Anole (<i>Anolis intermedius</i>)	SArb	E	23
Gray, brown or cream often lichen-like mottling; polymorphic - striped, wavy-banded or uniform-patterned; small fleshy crest often present; elevated, solitary white scales on gray sides give peppered appearance; venter white; dewlap of male ivory white; iris beige; to 53 mm.			
Slender Anole (<i>Anolis limifrons</i>)	SArb	E	56
Olive brown sometimes with reddish taint; lips white and continuous with stripe that becomes diffuse on body; undersurfaces very pale yellow; dewlap of male bone white with faint, orange-yellow subcentral spot; iris coppery-gold; to 42 mm.			
Stream Anole (<i>Anolis oxylophus</i>)	SArb,SAq,R	E	12 56
Dark brown often with olive cast, commonly overlain with darker bands, grading into dense speckling on sides of belly; distinct dorsolateral cream to yellow stripe fades before reaching groin; dewlap of male burnt orange; iris coppery; to 95 mm.			

Moist Forest Anole

SArb

E

12

(*Anolis sericeus*)

Pale brown to gray, sometimes overlain with butterfly-shaped or hourglass-like markings; belly cream; dewlap of male white or pale yellow to orange with a distinct, round to oval, bright blue to purple central spot; iris coppery; to 44 mm.

Cloud Forest Anole

SArb

E

234

(*Anolis tropidolepis*)

Medium to dark brown or nearly black that grades into cream belly, capable of lightening to gray-tan; striped individuals common; sides and belly have pearly reflectance; distinctive pale yellow to cream facial stripe extends down and backwards from eye (difficult to see in darkened color phase); dewlap of male plum to dark burgundy with tiny black or white spots (dependent on color phase); iris coppery or gold; to 60 mm.

Blue-eyed Anole

Arb

E

1234

(*Anolis woodi*)

Brown, light or dark olive, or gray often with brick red suffusion and with dark green or brown bands; striped individuals common; belly grayish or pale olive; dewlap of male capable of changing from pink-orange to yellow-green to black; usually two light spots below each eye; iris-metallic blue (less prominent in juveniles less than 50 mm); to 100 mm.

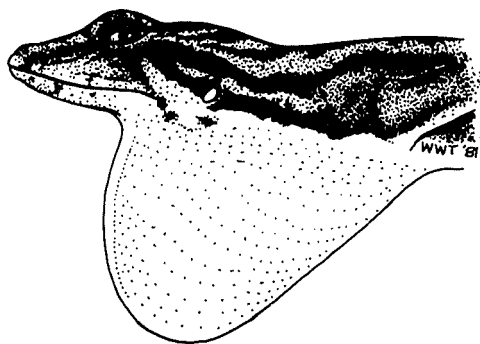


Fig. 21. Adult male Cloud Forest Anole, *Anolis tropidolepis*, showing typical facial striping and size of fully extended dewlap.

Common Basilisk (<i>Basiliscus basiliscus</i>)	SArb,SAq,R	E	1
Brown, olive or bronze (pale green in juveniles less than 80 mm); prominent crest on head, back and tail in males (weak or absent in females and juveniles); two pairs of light stripes on lips and sides most prominent in juveniles and becoming obscure with age; iris dark brown or black; to 200 mm.			
Emerald Basilisk (<i>Basiliscus plumifrons</i>)	SArb,SAq,R	pE	6
Brilliant green with scattered blue and black spots (reddish to golden brown with green head in juveniles less than 80 mm); prominent crest on head, back, and tail in males (weak or absent in females and juveniles); one or two series of light blue spots on sides; iris yellow or red; to 200 mm.			
Casque-headed Lizard (<i>Corytophanes cristatus</i>)	Arb	E	6
Black or brown with variable-sized, dark-edged yellow spots; head with prominent triangular, casque-like crest; head, crest, and limbs often with some green; iris coppery-gold; to 130 mm.			
Ctenosaur (<i>Ctenosaura similis</i>)	SArb	E	1
Tan, olive, olive-brown, gray with pairs of transverse black spots or bands on body and weak banding on tail; capable of lightening and darkening - may turn nearly black; juveniles less than 120 mm nearly uniform yellow-green; hatchlings green or tan, but soon turning green; iris brown; to 489 mm.			
Canopy Lizard (<i>Polychrus gutturosus</i>)	Arb	pE	6
Adults nearly uniform leaf green with weak banding, juveniles with middorsal bronze stripe and prominently light and dark banded with olive and dark olive green; banding usually more prominent on tail; iris coppery-bronze; to 170 mm.			
Green Spiny Lizard (<i>Sceloporus malachiticus</i>)	SArb	L	<u>1234</u>
Emerald green, olive, or brown often with traces of blue, but capable of darkening in some individuals to completely black; black collar on sides of neck; tail refractory blue when unbroken (especially in males); scales keeled and spine-tipped; throat and belly with azure blue patches that grade into turquoise and malachite green laterally and separated by black in mid-belly; iris gold-brown; to 91 mm.			

Family Teiidae - Whiptails and allies

Central American Whiptail (<i>Ameiva festiva</i>)	T	E	56
--	---	---	----

Dark olive to rich brown with prominent, middorsal, greenish blue to yellow stripe (faded on some large adults) and several lateral series of more or less fused bluish-cream spots or dashes extending to tail base; venter cream; underside of tail bluish; iris brown and gold-flecked; hatchlings and juveniles less than 60 mm with prominent, refractory blue tail; to 120 mm.

Barred Whiptail (<i>Ameiva undulata</i>)	T	pE	12
---	---	----	----

Olive or olive-brown backed, sometimes bordered by narrow white or cream stripes; sides uniform dark brown or dark with series of vertical greenish-blue bars; ventral surfaces ultramarine except around pinkish-flesh vent; iris brown and gold-flecked; hatchlings and juveniles less than 60 mm with prominent, refractory blue tail; to 100 mm.

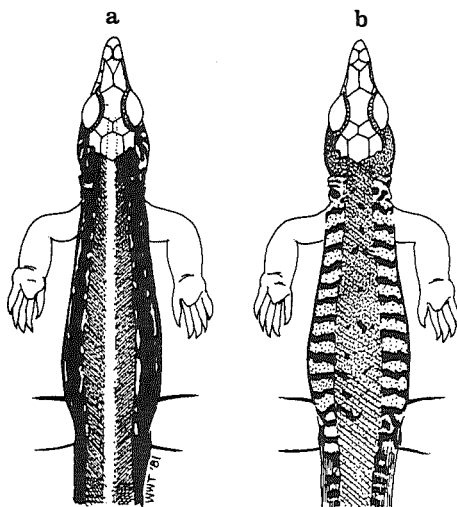


Fig. 22. Top views of whiptail lizards: a. Central American Whiptail, *Ameiva festiva*, showing solid stripe down center of back, b. Barred Whiptail, *Ameiva undulata*, showing dramatic barring along sides and absence of stripe down back.

Bromeliad Lizard (<i>Anadia ocellata</i>)	Arb,Br	U	6
--	--------	---	---

Medium to light beige with two subparallel rows of green, subcircular spots; venter cream to white; tail long; iris brown; to 63 mm.

Family Xantusiidae - Night Lizards

Tropical Night Lizard (<i>Lepidophyma flavimaculatum</i>)	Sf	E	6
--	----	---	---

Beige to dark brown or black with several longitudinal rows of variably sized white, cream, or yellow spots; scales of back granular with large scales regularly scattered among smaller ones; chin and throat reticulated with brownish black and cream; each scale of belly dusted with brown and having a light center; belly scales squarish or rectangular; lips barred with cream; iris brown; to 110 mm.

Family Scincidae - Skinks

Bronze-backed Climbing Skink (<i>Mabuya unimarginata</i>)	SArb	L	123
--	------	---	-----

Bronze-brown with black flecking; dark brown lateral stripes from snout to groin bordered below by cream to bluish white stripe; ventral surfaces light bluish- to greenish white; transparent window in lower eyelid; iris black; to 90 mm.

Litter Skink (<i>Sphenomorphus cherriei</i>)	Sf	E	56
---	----	---	----

Brown to dark brown; black eye mask continuing as diffuse stripe on sides, often with yellow spots; ventral surfaces yellowish except grayish tail tip; young juveniles less than 30 mm with bluish tail; no eyelid window; iris black; to 60 mm.

Family Anguillidae - Alligator lizards and allies

Green-bellied Caiman Lizard (<i>Celestus cyanochloris</i>)	T,SArb	U	123	6
---	--------	---	-----	---

Mottled bronze-brown with black speckling (olive or golden green individuals are known to occur elsewhere); sides beige with black speckling; reddish brown tail; chin and throat pale turquoise blue grading into lime blue-green on belly; shiny, rounded scales with fine ornamentation; underside of tail near-orange; eyes moderate-sized, pupil nearly round (eccentric), iris dark-brown; limbs relatively short; tail scales keeled and aligned giving ribbed appearance; to 78 mm.

Galliwasp	T	E	6
-----------	---	---	---

(*Diploglossus bilobatus*)

Brown variably checkered with black, dorsolateral line of golden dashes (juveniles uniform black or dark brown); golden spots on brown sides (juveniles with some pale green spots); belly pink (juveniles gray); limbs short; iris coppery-brown; to 130 mm.

Family Typhlopidae - Blind Snakes

Costa Rican Blind Snake	F	E	23
-------------------------	---	---	----

(*Typhlops costaricensis*)

Uniform brown to beige; wormlike; blunt head; tail similarly blunt; venter barely lighter; belly scales subequal to dorsal scales in size; eyes small, covered by scales; to 400 mm.

Family Boidae - Boas

Boa constrictor	SArb	L	12
-----------------	------	---	----

(*Boa constrictor*)

Beige to medium brown with rich pattern of brown, black, and white bands, bars, diamonds and/or spots; brown ground color grades into red-brown on tail; scales iridescent, especially in recently shed individuals; heavy-bodied; pupil vertical, iris brown in eye stripe, remainder beige; largest Costa Rican snake, may exceed 5500 mm.

Family Colubridae - Colubrid snakes

Ridge-nosed Snake	Sf	U	6
-------------------	----	---	---

(*Amastridium veliferum*)

Dark brown or black, conspicuous markings absent; faint brown lines on neck scales; snout (canthus) sharply angled; fine blue flecking on chin; pupil round, iris dark brown to black; tongue black; to 600 mm.

Green Keelback	SArb	U	12345
----------------	------	---	-------

(*Chironius exoletus*)

Uniform green, although scuffed scales appear as blue spots; skin of neck region between scales dark (usually black) with an indication of vertically bluish bars, visible only when snake displays or has eaten; lips and chin yellowish; venter pale green; eyes large, pupil round, iris dark brown; tongue red; to 1700 mm; juveniles less than 600 mm brownish green.

Ebony Keelback (<i>Chironius grandisquamis</i>)	T,SArb	pE	12	56
Shiny black, rarely peppered with white spots; chin and anterior part of belly white; eyes large, pupil round; tongue black; to 2700 mm; juveniles less than 700 mm have diffuse yellow bars or spots.				
Mussurana (<i>Clelia clelia</i>) *	T	pE		6
Adults uniform shining slate blue-gray; chin, throat and anterior belly cream to dirty white; iris slate; to 2600 mm; juveniles less than 700 mm uniform pink or red with black neck collar.				
Montane Mussurana (<i>Clelia scytalina</i>) *	T	U		34
Uniform black, brown, or violet to slate blue-gray, scales iridescent; chin and venter light; head with white band; iris black; to 1400 mm; juveniles less than 700 mm have diffuse yellow bars or spots.				
Brown Debris Snake (<i>Coniophanes fissidens</i>) *	Sf	E	<u>1</u>	6
Medium glossy brown with middorsal series of small, black spots; head slightly dark brown, sometimes two pairs of white nape spots on neck (the first distinct; the second blending posteriorly with dorsal color); white eyestripe, bordered by black on top, prominent behind eye and weak anteriorly; chin and venter cream with tiny black spots; eyes moderate-sized, pupil round, iris rich brown; tongue black; to 600 mm.				
Twin-striped Debris Snake (<i>Coniophanes piceivittis</i>) *	Sf	pE		<u>12</u>
Black to third scale row on each side with two dorsolateral white stripes the length of the body, beige to pale brown on lower sides; venter white; eyes moderate-sized, pupil round; tongue black; to 600 mm.				
Pink-tailed Forest Racer (<i>Dendrophidion nuchalis</i>)	T,SArb	pE		<u>1</u>
Uniform green or with faint dark-edged light crossbands; belly beige to pale yellow except toward tail, posterior undersurfaces pink to rose, adults with suffusion of dark pigment on medial portion of belly scales; to 1400 mm.				

Cloud Forest Racer (<i>Dendrophidion paucicarinatum</i>)	T,SArb	pE	234
Uniform olive green to brown (greener snakes near the continental divide, browner snakes down the Pacific slope); dark stripe on upper portion of upper lips passing below eye to neck; below yellow to beige, becoming paler anteriorly; eyes large, pupil round, iris dark, upper one-fourth lighter; tongue brown; to 1500 mm; juveniles less than 600 mm with bars, often alternating along midline.			
Brown Forest Racer (<i>Dendrophidion percarinatum</i>)	T,SArb	pE	1
Brown with small, clustered black spots appearing as indistinct crossbands on posterior three-fourths of body, posterior half of body has indistinct pale stripes; venter off-white to beige; eyes large, pupil round; tongue brown; to 1900 mm.			
Lowland Forest Racer (<i>Dendrophidion vinitor</i>)	T,SArb	pE	6
Green with distinct dark-edged, bluish-white crossbands (juveniles with more crossbands over length of body); belly white or pale yellow; eyes large, pupil round, iris gold-flecked on black; tongue brown; to 1400 mm.			
Black-tailed Cribo (<i>Drymarchon corais</i>)	T	E	123
Beige with black, tear-drop or brush-painting like markings under eyes and on sides of neck; tail slate gray to blue black; venter cream with irregular black markings; eyes moderate-sized, pupil round, iris black, paler above; largest New World colubrid; to 3000 mm.			
Speckled Racer (<i>Drymobius margaritiferus</i>) *	T	E	123
Black to dark green with yellow to orange spot on each scale; head black with yellow Y-shaped mark; eyes large, pupil round; tongue black; to 1200 mm; juveniles less than 600 mm have diffuse yellow barring.			
Lower-Montane Green Racer (<i>Drymobius melanotropis</i>) *	T	pE	6
Nearly uniform green above, including outer fourth of belly scales, keels of scales of three middorsal rows black; venter yellow; juveniles with black and white flecking between scales that appear as narrow crossbands; iris brown; tongue black; to 1300 mm.			

Collared Snake (<i>Enulius sclateri</i>)	Sf	U	5
Slate gray or black with a distinct white collar or white head; venter off-white; eyes small, iris black; tail long, when unbroken; to 700 mm.			
Brilliant-ringed Snake (<i>Erythrolamprus bizonus</i>) *	T,Sf	pE	123
Tricolored pattern of rings, red rings broadest, separated from narrow white or yellow rings by black, margin of black rings adjacent red ones marked with white; head black with white on lips and snout; eyes moderate-sized, pupil round, iris black; tongue black; to 1000 mm.			
Gray Earth Snake (<i>Geophis brachycephalus</i>)	F	pE	234
Uniform gray to dark gray; blunt head; belly with alternating white and gray bars; small black eyes, pupil not easily distinguishable; tongue black; to 600 mm.			
Yellow-bellied Earth Snake (<i>Geophis godmani</i>)	F	U	4
Uniform dark gray to black; blunt head; belly bright lemon yellow with irregularly spaced black dashes; snout with some white or yellow; small black eyes, pupil not easily distinguishable, but round; to 500 mm.			
Hoffman's Earth Snake (<i>Geophis hoffmani</i>)	F	E	2
Uniform iridescent gray with yellowish-white to brown region where sides meet belly; belly cream to yellowish-white, unspotted or with gray on anterior scale edges; scales smooth except above cloaca in males; tongue gray; iris black; juveniles less than 150 mm with yellowish collar; to 400 mm.			
Ruthven's Earth Snake (<i>Geophis ruthveni</i>)	F	pE	6
Uniform dark gray or black; belly cream; scales smooth except above cloaca in males; eyes small, iris black; tongue black; to 400 mm.			



Fig. 23. Brilliant-ringed Snake (*Erythrolamprus bizonus*); colors are black (black), white, pale yellow, or orange white (white), and red (stipple).

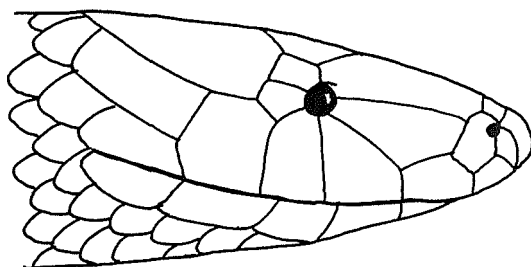


Fig. 24. Head of Gray Earth Snake (*Geophis brachycephalus*).

Tropical Seep Snake	SAq,F,Sw	U	1	6
<i>(Hydromorphus concolor)</i>				

Uniform brown with indistinct, paired black spots; blunt, flattened head; belly cream and brown with impression of alternating brown and cream bars in some individuals except that brown bars are irregular and often broken; nostrils dorsal; small eyes, iris coppery brown, pupil round; to 900 mm.

Blunt-headed Tree Snake	Arb	E	123456
<i>(Imantodes cenchoa)</i> *			

Thirty-one to 52 dark brown blotches on a beige, tan, or gray background; middorsal scale row much larger than adjacent rows; very slender, vinelike; head broad, blunt; large bulging eyes, pupil vertical, iris gray; tongue brown; to 1300 mm.

Dry Forest Tree Snake	Arb	E	1
<i>(Imantodes gemmistratus)</i> *			

Forty-one to 73 dark brown blotches on a beige, tan, or gray background, or rarely unblotched; middorsal scale row only slightly larger than adjacent rows; very slender, vinelike; head broad, blunt; large bulging eyes, pupil vertical, iris gray; tongue brown; to 1100 mm.

Plain Tree Snake	Arb,R,Sw	E	3 5
<i>(Imantodes inornatus)</i> *			

Light tan to pink, peppered with small black spots, often with an orangish cast, translucent when held up against strong light; very slender, vinelike; head broad, blunt; belly cream; large bulging eyes, pupil vertical, iris beige; to 800 mm.

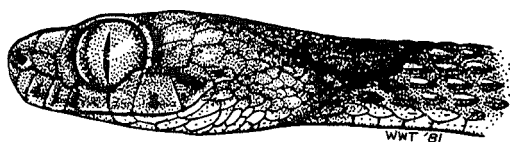


Fig. 25. Blunt-headed Tree Snake (*Imantodes cenchoa*) showing large eyes with vertical pupils (as visible in daylight).

Tropical Kingsnake	T,Sf	E	234
<i>(Lampropeltis triangulum)</i>			

Tricolored pattern of rings, red rings broadest but often irregular, narrow white rings separated from red by irregular black rings, pattern often nearly entirely masked by black in individuals larger than 900 mm, white rings sometimes orange; eyes moderate-sized, pupil round, iris reddish; tongue black; to 1800 mm.

Cat-eyed Snake	SArb,R,Sw	E	2 6
<i>(Leptodeira septentrionalis) *</i>			

Tan, brown, gray, or red with 23 or more darker brown blotches or bands, often with blotches fused to form zig-zag pattern; light beige to white belly; pupil vertical, beige iris; to 900 mm.

Green-headed Racer	T	pE	1
<i>(Leptodymus pulcherrimus) *</i>			

Beige to cream with pair of prominent, black, dorsolateral stripes; top of head and tail green; black eyestripes continuous with dorsolateral stripes; chin white, belly white to beige with pink taint on tail undersurfaces; eyes large, pupil round, iris brown and darker where eye stripe crosses eye; tongue forks black, red basally; to 1600 mm.

Green Parrot Snake	SArb	E	1
<i>(Leptophis ahaetulla) *</i>			

Uniform leaf green, although scuffed scales may appear as blue spots; slender; belly pale green; chin pale blue; black eyestripe from nostril to angle of jaw; eyes large, pupil round, iris yellow; tongue black; to 2000 mm.



Fig. 26. Tropical Kingsnake (*Lampropeltis triangulum*); colors are black (black), white or cream (white), and red (stipple).

Mexican Parrot Snake	SArb	E	12
<i>(Leptophis mexicanus)</i> *			

Leaf green with three bronze to gold stripes, one middorsal and two lateral; slender black eyestripe extends onto neck; loreal scale present; chin yellowish to white; belly pink to salmon; eyes large, pupil round; to 1600 mm.

Bronze-striped Parrot Snake	SArb	E	234 6
<i>(Leptophis nebulosus)</i> *			

Virtually identical in coloration and pattern to Mexican Parrot Snake (see p. 54); loreal scale absent; to 1600 mm.

Fire-bellied Snake	T	E	123456
<i>(Liophis epinephalus)</i>			

Pattern of orange or red-orange and black bands; topside of posterior orange bands pale blue; skin between scales of neck region medium to brilliant orange, displayed by neck flattening; chin and neck yellow or yellow-green which grades into bright red on belly, checkered or interrupted by squarish spots or black lines; pupil round, tongue black; to 800 mm.

Dry Forest Whipsnake	T	E	1
<i>(Masticophis mentovarius)</i>			

Uniform beige to brown, flecked with tiny black spots; chin off-white grading to pink and rose on venter and underside of tail; eyes large, pupil round; tongue brown; to 2000 mm.

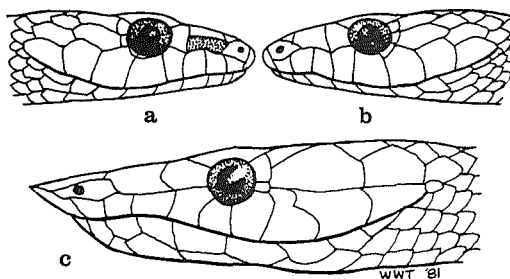


Fig. 27. Profiles of three of the larger, green-colored snakes: a. Mexican Parrot Snake (*Leptophis mexicanus*) showing loreal scale (stipple), b. Green Parrot Snake (*Leptophis nebulosus*) without loreal, and c. Green Vine Snake (*Oxybelis fulgidus*) showing elongated snout.

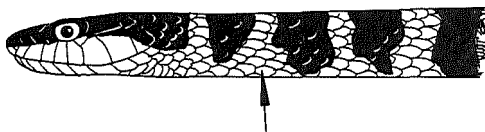


Fig. 28. Fire-bellied Snake (*Liophis epinephalus*) ; light bands are greenish orange (arrow), but bright orange skin concealed between scales is displayed during its distinctive neck-flattening behavior.

Salmon-bellied Racer	T	pE	123
<i>(Mastigodryas melanolomus)</i>			

Light to medium brown with two cream dorsolateral stripes, adults may have faint indications of squarish blotches; chin yellowish; belly cream, beige, or salmon; eyes large, iris beige, pupil round; tongue black; to 1400 mm; juveniles with dark brown or black squarish blotches and checkered chin and throat.

Spotted Wood Snake	St,T	pE	6
<i>(Ninia maculata)</i>			

Gray with black or brown-black spots or crossbars; body triangular in cross-section; white or cream belly checkered with black spots; iris black; tongue black; to 650 mm.

Wood Snake	St,T	E	234
<i>(Ninia psephota)</i>			

Black or gray, often with pale crossbars; body triangular in cross-section; yellow or red belly checkered with dark spots; iris black; tongue black; to 600 mm.

Brown Vine Snake	Arb	E	12
<i>(Oxybelis aeneus) *</i>			

Slender, light brown peppered with tiny black and white spots; belly nearly identical to dorsum in color; chin white, with or without reddish stripes; snout elongate and pointed; iris yellow or beige; tongue brown; to 1700 mm.

Short-nosed Vine Snake	Arb	pE	6
<i>(Oxybelis brevirostris) *</i>			

Adults uniform green, undersurfaces paler green; iris black and gold; short, black line through eye; tongue green; to 1200 mm; juveniles less than 600 mm with weakly marked, pale bands.

Green Vine Snake (<i>Oxybelis fulgidus</i>) *	Arb	pE	123456
Slender, uniform leaf green, except scuffed scales appear blue; two narrow lateral yellow stripes separate dorsum from belly; belly paler than back, but still bright, almost chartreuse (lime) green; snout elongate and pointed; iris yellow; tongue green; to 2000 mm.			
Halloween Snake (<i>Pliocercus euryzonus</i>)	T,Sf	E	6
Pattern of orange or orange-red and black rings, black rings at least twice as broad as orange rings; tongue black; eyes moderate-sized, pupil round, iris black; to 1000 mm.			
Bird-eating Snake (<i>Pseustes poecilonotus</i>)	Arb	pE	6
Blackish brown or green, irregularly barred with yellow (juveniles have more barring); lips, throat, and belly yellow grading into pure black under tail; eyes moderate-sized, pupil round, iris dark brown; tongue black; to 2400 mm.			
Green Litter Snake (<i>Rhadinaea calligaster</i>)	Sf	E	34
Peppered green on brown that appears uniform olive green, rarely brown individuals occur; one or more lines of black dots, half-moons or a solid stripe running down middle of cream to beige belly; iris brown; tongue black; to 600 mm.			
Long-tailed Litter Snake (<i>Rhadinaea decipiens</i>)	Sf	E	5
Gray to rich brown or black with one or two pairs of white or yellow stripes; with or without pink to orangish light collar; chin and throat pale yellow to cream; belly cream, often with black spots, more or less regularly arranged along midline; tail long, but frequently broken; tongue forks white, black basally; iris brown; to 600 mm.			
Pink-bellied Litter Snake (<i>Rhadinaea decorata</i>)	Sf	pE	6
Medium tan to dark brown with dark-bordered, dorsolateral white to tan stripe from behind each eye, becoming diffuse posteriorly, stripes often broken up into dark-bordered "eye-spots" just behind eyes; chin and throat off-white becoming pale yellow or orange under the neck then uniform pale or reddish orange, or red on belly and underside of tail; iris tan to brown; tongue black; to 500 mm.			

Orange-bellied Litter Snake (<i>Rhadinaea guntheri</i>)	Sf	pE	<u>2345</u>
Rich, dark brown with two narrow cream or yellow stripes on each side of the body; belly uniform orange to orange-red; chin cream; iris brown; tongue black with white forks; to 800 mm.			
Striped Litter Snake (<i>Rhadinaea serperaster</i>)	Sf	pE	<u>234</u>
Beige with narrow middorsal dark stripe and at least four light and dark lateral stripes on each side; venter light nacreous beige; lips strongly marked with white; chin off-white; iris brown; tongue black; to 400 mm.			
Skink-eater (<i>Scaphiodontophis venustissimus</i>)	T,Sf	pE	6
Tricolored pattern of dull red, yellow, and black bands; tail very long, frequently broken; venter cream to yellow; tongue black; iris brown; to 1000 mm.			
Harlequin Snake (<i>Scolecophis atrocinctus</i>)	Sf,T,SArb	pE	12
Pattern of light and dark rings; dark rings black, light rings orange dorsally, pale blue with black spots on sides, and pale blue on belly; iris black; tongue black; to 600 mm.			
Olivaceous Rat Snake (<i>Senticolis triaspis</i>)	SArb	pE	123
Uniform olive green-brown, adults may have traces of blotching on head and neck; chin often yellowish; venter cream to pinkish; pupil round, iris beige; to 1300 mm; juveniles less than 600 mm with prominent, dark-edged, reddish-brown blotches.			
Ringed Snail-eater (<i>Sibon annulata</i>)	Arb	pE	<u>23</u> 6
Twenty-six to 35 black-edged, brown-centered bands that almost meet on belly; spaces between bands green above and white below, irregularly flecked throughout with black; body slender; belly white with scattered fine flecks, with or without pinkish tinge; pupil vertical, iris beige or black; tongue dark brown; to 560 mm.			



Fig. 29. Harlequin Snake (*Scolecophis atrocinctus*) ; colors are black (black), bluish white (white), and orange (stipple).

Banded Snail-eater (<i>Sibon dimidiata</i>)	Arb	pE	<u>2</u>
Twenty-three to 33 dark-brown edged, tan-centered bands or blotches that rarely meet on belly and sometimes alternate along back; spaces between bands or blotches dark above and cream below; body slender; finely flecked, cream belly; pupil vertical, iris brown; tongue black; to 660 mm.			
Lichen-colored Snail-eater (<i>Sibon longifrenis</i>)	Arb	pE	6
Lichen-like gray or greenish gray ground color with black- or dark-brown edged cream, yellow or orange ocelli on each side; body slender; cream or yellow belly finely flecked with black; pupil vertical, iris brown; tongue brown; to 700 mm.			
Mica (<i>Spilotes pullatus</i>)	Arb	pE	2
Shiny black with blotches and bands of yellow on first third of body and head; chin mottled cream and black; underside of neck pale yellow with irregularly spaced black bars which fuse posteriorly into solid black belly; eyes large, pupil round, iris brown to black; tongue black; to 2200 mm.			
Scorpion-eater (<i>Stenorrhina freminvillei</i>)	Sf	U	12
Tan or brown, often with faint stripes, sometimes reddish-brown; belly pale yellow to cream; snout blunt; eyes small, pupil round, iris brown to black; tongue forks brown, red basally; to 800 mm.			
Tricolored Crowned Snake (<i>Tantilla annulata</i>) *	Sf	E	<u>6</u>
Red, black, and white or yellow banded with white or yellow bands always separated from red bands, black and white bands often broken or offset dorsally; venter bright red or red-orange; iris brown; tongue black; to 650 mm.			
Striped Crowned Snake (<i>Tantilla armillata</i>) *	Sf	pE	12
Medium brown with thin middorsal black line and faint beige stripes on lateral-most dorsal scale rows; head cap black with white postnuchal collar and white spots behind eyes; belly nacreous to translucent; iris brown; tongue black; to 400 mm.			

Orange-bellied Crowned Snake (<i>Tantilla melanocephala</i>) *	Sf	pE	123
Medium brown with thin middorsal dark stripe and several light and dark lateral stripes on each side; nuchal collar reduced to pair of light spots on neck; chin and throat off-white grading into pale orange or coral on belly and underside of tail; iris brown; tongue black; to 500 mm.			
Red-tailed Crowned Snake (<i>Tantilla schistosa</i>) *	Sf	pE	2 6
Uniform brown or gray; head without distinct dark cap; nuchal collar absent or weakly marked; chin with orange wash; neck and belly beige to cream becoming spotted with red-orange to red on posterior half of belly, posterior belly and underside of tail bright red-orange, occasional individuals lack orange or red; eyes small, pupil round, iris brown; tongue brown; to 400 mm.			
Slender Dwarf Snake (<i>Trimetopon gracile</i>)	Sf	pE	234
Uniform brown; faint nuchal collar; beige to off-white venter; iris brown; tongue black; one postocular scale; to 400 mm.			
Faded Dwarf Snake (<i>Trimetopon pliolepis</i>)	Sf	pE	23
Pattern virtually identical to Striped Litter Snake (see p. 57) except that entire pattern appears faded; belly iridescent, translucent white; iris brown; tongue black; to 400 mm.			
White-bellied Dwarf Snake (<i>Trimetopon simile</i>)	Sf	pE	4
Pattern virtually identical to Slender Dwarf Snake (see above) except two postocular scales are present; to 400 mm.			
Slevin's Dwarf Snake (<i>Trimetopon slevini</i>)	Sf	pE	2
Rich, uniform, dark brown; faint nuchal collar; lips strongly marked with white; white chin grading into bright orange on belly and underside of tail; iris brown; tongue black; to 400 mm.			
False Fer-de-Lance (<i>Xenodon rabdocephalus</i>) *	T,Sf	pE	2
Brown with pale-edged, irregular hourglass markings; head brown with pale eyestripe; chin white; belly beige with small dark spots; tongue brown; pupil round, iris beige-brown; to 900 mm.			

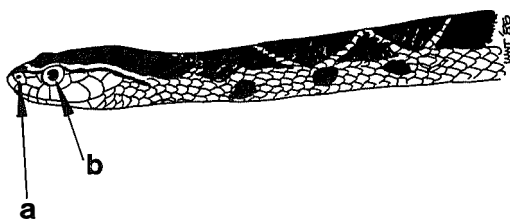


Fig. 30. False Fer-de-Lance (*Xenodon rabdocephalus*) showing (a) nostril and (b) round pupil. Compare with Fig. 32.

Family Elapidae - Coral snakes, cobras, and allies

Allen's Coral Snake	Sf	pE	6
<i>(Micrurus alleni)</i> †			

Ringed pattern of red, white, or yellow and black, red rings broadest and contact narrow white or yellow rings which separate red and black rings; red absent from tail rings; black head cap extends backwards between large (parietal) scales on back of head, sometimes covering these entirely; eyes small, black, pupil not distinguishable, iris black; tongue black; to 950 mm.

Central American Coral Snake	Sf	E	123
<i>(Micrurus nigrocinctus)</i> †			

Ringed pattern of red, white, or yellow and black, red rings broadest and contact narrow white or yellow rings which separate red and black rings; red absent from tail rings; black head cap just barely reaches large (parietal) scales on back of head; eyes small, pupil not distinguishable, iris black; tongue black; to 1000 mm.



Fig. 31. Central American Coral Snake (*Micrurus nigrocinctus*) ; colors are black (black), yellow or white (white), and red (stipple).

Family Viperidae - Vipers

Fer-de-lance	T	L	1	56
<i>(Bothrops asper)</i> †				

Rich velvety brown with dark-edged triangular blotches, often fused into hourglass markings; head large but slender; chin yellowish; belly cream; pupil vertical, iris beige to brown; tongue brown; to 2000 mm.

Green Palm Viper	Arb	pL	123456
<i>(Bothriechis lateralis)</i> †			

Uniform leaf green with two narrow, ventrolateral yellow stripes and small, paired yellow spots at irregular intervals; scuffed green scales may appear blue; belly pale green; juveniles less than 500 mm with distinct, refractory blue tail tip; pupil vertical, iris yellow to tan; tongue green; to 1000 mm.

Green and Black Viper	Arb	pL	234
<i>(Bothriechis nigroviridis)</i> †			

Green and black flecked appearing dark green; chin and belly lighter green with some black spotting; pupil vertical, iris black; tongue black; to 700 mm.

Eyelash Viper	Arb	L	12	6
<i>(Bothriechis schlegelii)</i> †				

Variable, three color patterns exist: 1) lichen-like and greenish with pale lateral spots (the most common in this region), 2) bright yellow, and 3) bright leaf green; belly mottled cream, brown, yellow, or green (depending on color morph); two or three hornlike scales ("eyelashes") project over each eye; pupil vertical, iris beige to yellowish; tongue brown; to 700 mm.

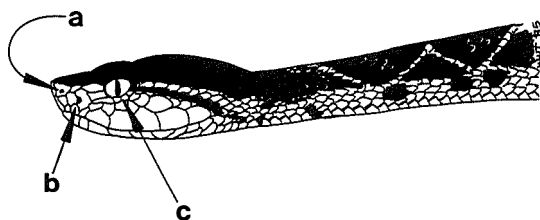


Fig. 32. Fer-de-Lance (*Bothrops asper*) showing (a) nostril, (b) facial pit, and (c) vertical pupil.

ACKNOWLEDGMENTS

Many individuals contributed to the development of this field list. Space does not permit us to list individually everyone who contributed specimens or photographs, but we owe them special thanks. The following people made particularly substantial contributions: Giovanni Bello, Eladio Cruz, Michael and Patricia Fogden, Benito, Tomás, Tonio, and Wilford Guindon, John Iverson, Dana Krempels, Richard and Meg La Val, Bob Law, Carlos, Genaro, and Manuel Mata, Bobby Maxson, David Ortega, Miguel Ramirez, Douglas Robinson, Jay Savage, Ian Straub, Karen Timmerman, Alexander and Angel Uillegas, and Kathy Winnett-Murray. Vinicio Sosa provided the Spanish translation of the abstract. This work could not have been done without the cooperation of the residents and landowners of Monteverde, and the Tropical Science Center, whose joint participation in the care and management of the Monteverde Cloud Forest Preserve is exemplary; we dedicate this work to them.

REFERENCES

- Cannatella, D. C., and K. de Quieroz. Phylogenetic systematics of the anoles: Is a new taxonomy warranted? *Systematic Zoology* 38(1):57-69.
- Frost, D. R. (editor) 1985. *Amphibian species of the world: a taxonomic and geographical reference*. Allen Press, Inc., and the Association of Systematic Collections, Lawrence, Kansas. 731 pp.
- Frost, D. R. 1987. A replacement name for *Glossostoma* Günther, 1900 (Anura: Microhylidae). *Copeia* 1987 (4):1025.
- Guyer, C., and J. M. Savage. 1986. Cladistic relationships among anoles (Sauria: Iguanidae). *Systematic Zoology* 35(4):509-531.
- Hartshorn, G. S. 1983. Chapter 7: Plants: Introduction. pp. 118-183. In: D. W. Janzen (editor), *Costa Rican Natural History*. The University of Chicago Press.
- Holdridge, L. R. 1967. *Life zone ecology*. Revised edition. Tropical Science Center, San Jose, Costa Rica. 206 pp.
- Law, B., and M. Fogden. 1981. *The birds of Monteverde*. Published by the Pensión Quetzál, Monteverde, Costa Rica. 32 pp.
- Madrigal, R., and E. Rojas. 1980. *Manual descriptivo del mapa geomorfológico de Costa Rica*. Published through SEPSA (Secretaría ejecutiva de planificación sectorial agropecuaria y de recursos naturales renovables) by Imprenta Nacional, San José, Costa Rica.
- Miyamoto, M. M. 1986. Phylogenetic relationships and systematics of the *Eleutherodactylus fitzingeri* Group (Anura, Leptodactylidae). *Copeia* 1986 (2):503-511.

- Savage, J. M. 1980. A handlist with preliminary keys to the herpetofauna of Costa Rica. Special Publication of the Allan Hancock Foundation, University of Southern California. 111 pp.
- _____, and J. Villa R. 1986. Introduction to the herpetofauna of Costa Rica/ Introducción a la herpetofauna de Costa Rica. Society for the Study of Amphibians and Reptiles. 207 pp.
- Timmerman, W. W., and M. P. Hayes. 1981. The reptiles and amphibians of Monteverde: an annotated list to the herpetofauna of Monteverde, Costa Rica. Published by the Pensión Quetzál, Monteverde in cooperation with the Tropical Science Center, San José, Costa Rica. 32 pp.
- Tosi, J. A., Jr. 1969. Mapa ecologico: Republica de Costa Rica. Centro Científico Tropical, San José, Costa Rica.
- Van Devender, R. W. 1980. Preliminary checklist of the herpetofauna of Monteverde, Puntarenas Province, Costa Rica and vicinity. *Brenesia* 17:319-325.
- Williams, E. E. A critique of Guyer and Savage (1986): Cladistic relationships among anoles (Sauria: Iguanidae): Are the data available to reclassify the anoles? In: C. A. Woods (Ed.) *Biogeography of the Caribbean: Past, Present and Future*. E. J. Brill, Leiden, Netherlands. (in press).

INDEX TO SPECIES LIST

<i>Agalychnis annae</i>	36	<i>Bolitoglossa "subpalmata"</i>	29
<i>callidryas</i>	37	<i>Bothriechis lateralis</i>	61
<i>Amastridium veliferum</i>	48	<i>nigroviridis</i>	61
<i>Ameiva festiva</i>	46	<i>schlegelii</i>	61
<i>undulata</i>	46	<i>Bothrops asper</i>	61
Amphibia	29	<i>Bufo coccifer</i>	35
Amphibians	29	<i>coniferus</i>	35
<i>Anadia ocellata</i>	47	<i>haematiticus</i>	36
Anguidae	47	<i>marinus</i>	36
Anole, Blue-eyed	44	<i>melanochloris</i>	36
Cloud Forest	44	<i>periglenes</i>	36
Dry Forest	43	Bufo	35
Giant Banded	43	<i>Caecilian, Gray</i>	29
Gray Lichen	43	<i>Purple</i>	29
Green Tree	42	<i>Caecilians</i>	29
Ground	43	<i>Caeciliidae</i>	29
Moist Forest	44	<i>Caudata</i>	29
Montane	42	<i>Celestus cyanochloris</i>	47
Pug-nosed	42	<i>Centrolenella</i>	
Slender	43	<i>colymbiophyllum</i>	40
Stream	43	<i>euknemos</i>	40
<i>Anolis altae</i>	42	<i>fleischmanni</i>	40
<i>biporcatus</i>	42	<i>granulosa</i>	40
<i>capito</i>	42	<i>prosoblepon</i>	40
<i>cupreus</i>	43	<i>valerioi</i>	41
<i>humilis</i>	43	<i>vireovittata</i>	41
<i>insignis</i>	43	<i>Centrolenidae</i>	40
<i>intermedius</i>	43	<i>Chironius exoletus</i>	48
<i>limifrons</i>	43	<i>grandisquamis</i>	49
<i>oxylophus</i>	43	<i>Clelia clelia</i>	49
<i>sericeus</i>	44	<i>scytalina</i>	49
<i>tropidolepis</i>	44	<i>Colubridae</i>	48
<i>woodi</i>	44	<i>Coniophanes fissidens</i>	49
<i>Anotheca spinosa</i>	39	<i>piceivittis</i>	49
Anura	30	Coral Snake, Allen's	60
<i>Atelopus varius</i>	35	<i>Central American</i>	60
<i>Basiliscus basiliscus</i>	45	Coral Snakes	60
<i>plumifrons</i>	45	<i>Corytophanes cristatus</i>	45
Basilisk, Common	45	Cribo, Black-tailed	50
Emerald	45	Crowned Snake,	
Blind Snake, Costa Rican	48	<i>Orange-bellied</i>	59
<i>Boa constrictor</i>	48	<i>Red-tailed</i>	59
<i>Boa constrictor</i>	48	<i>Striped</i>	58
Boas	48	<i>Tri-colored</i>	58
Boidae	48	Ctenosaur	45
<i>Bolitoglossa robusta</i>	29	<i>Ctenosaura similis</i>	45

Debris Snake, Brown	49	Fringe-limbed Treefrog,	
Twin-striped	49	Highland	37
<i>Dendrophidion nuchalis</i>	49	Lowland	37
<i>paucicarinatum</i>	50	Frog, Crowned	39
<i>percarinatum</i>	50	Green-eyed	42
<i>vinitor</i>	50	Harlequin	35
<i>Dermophis mexicanus</i>	29	Lemur	37
Dink Frog, Common	31	Quark	33
Montane	31	Sheep	30
<i>Diploglossus bilobatus</i>	48	Smoky Jungle	34
<i>Drymarchon corais</i>	50	Swamp	37
<i>Drymobius margaritiferus</i>	50	Frogs	30
<i>melanotropis</i>	50	Frogs, True	41
Dwarf Snake, Faded	59	Galliwasp	48
Slender	59	<i>Geophis brachycephalus</i>	51
Slevin's	59	<i>godmani</i>	51
White-bellied	59	<i>hoffmani</i>	51
Earth Snake, Gray	51	<i>ruthveni</i>	51
Hoffman's	51	Glass Frog, Bare-hearted	40
Ruthven's	51	Cascade	40
Yellow-bellied	51	Emerald	40
Elapidae	60	Fleischmann's	40
<i>Eleutherodactylus altae</i>	31	Granular	40
<i>andi</i>	32	Green-striped	41
<i>angelicus</i>	34	Reticulated	41
<i>biporcatus</i>	30	Glass Frogs	40
<i>bransfordii</i>	34	Gymnophiona	29
<i>caryophyllaceus</i>	31	<i>Gymnopsis multiplicata</i>	29
<i>crassidigitus</i>	32	<i>Hydromorphus concolor</i>	52
<i>cruentus</i>	31	<i>Hyla angustilineata</i>	38
<i>cuaquero</i>	33	<i>fimbrimembra</i>	37
<i>diastema</i>	31	<i>loquax</i>	37
<i>fitzingeri</i>	33	<i>miliaria</i>	37
<i>hylaeformis</i>	31	<i>pseudopuma</i>	38
<i>melanostictus</i>	33	<i>rivularis</i>	38
<i>podiciferus</i>	34	<i>rufiocularis</i>	39
<i>ridens</i>	31	<i>tica</i>	39
<i>rugulosus</i>	34	<i>uranochroa</i>	39
<i>Enallagma sclateri</i>	51	Hylidae	36
<i>Erythrolamprus bizonus</i>	51	Hylinae	37
Fer-de-Lance	61	<i>Hypopachus variolosus</i>	30
Fer-de-Lance, False	59	Iguanidae	42
Forest Frog, Brilliant	42	<i>Imantodes cenchoa</i>	52
Forest Racer, Brown	50	<i>gemmistratus</i>	52
Cloud	50	<i>inornatus</i>	52
Lowland	50	Keelback, Green	48
Pink-tailed	49	Ebony	49
		Kingsnake, Tropical	53

<i>Lampropeltis triangulum</i>	53	<i>Ninia psephota</i>	55
Leaf Frog, Golden-eyed	36	<i>Nototriton picadoi</i>	29
Red-eyed	37	<i>Oedipina poelzi</i>	30
Leopard Frog, Dry Forest	41	<i>uniformis</i>	30
Leptodactylidae	30	<i>Oxybelis aeneus</i>	55
<i>Leptodeira septentrionalis</i>	53	<i>brevirostris</i>	55
<i>Leptodrymus</i>		<i>fulgidus</i>	56
<i>pulcherrimus</i>	53	Parrot Snake,	
<i>Lepidophyma</i>		Bronze-striped	54
<i>flavimaculatum</i>	47	Green	53
<i>Leptodactylus</i>		Mexican	54
<i>pentadactylus</i>	34	<i>Phyllomedusa lemur</i>	37
<i>Leptophis ahaetulla</i>	53	Phyllomedusinae	36
<i>mexicanus</i>	54	Plethodontidae	29
<i>nebulosus</i>	54	<i>Pliocercus euryzonus</i>	56
<i>Liophis epinephalus</i>	54	<i>Polychrus gutturosus</i>	45
Litter Frog, Bransford's	34	<i>Pseustes poecilonotus</i>	56
Piglet	34	Rain Frog, Broad-headed	30
Litter Snake, Green	56	Common	33
Long-tailed	56	Coral-spotted	31
Orange-bellied	57	Golden-groined	31
Pink-bellied	56	Leaf-breeding	31
Striped	57	Lowland	34
Lizard, Bromeliad	47	Monteverde	33
Canopy	45	Pygmy	31
Casque-headed	45	Salmon-bellied	32
Green-bellied Caiman	47	Slim-fingered	32
Lizards	42	Tilarán	34
Lizards, Alligator	47	<i>Rana forreri</i>	41
Iguanid	42	<i>vibicaria</i>	42
Night	47	<i>warschewitschii</i>	42
<i>Mabuya unimarginata</i>	47	Ranidae	41
<i>Masticophis mentovarius</i>	54	Racer, Green-headed	53
<i>Mastigodryas</i>		Lower-Montane Green	50
<i>melanolomus</i>	55	Salmon-bellied	55
Mica	58	Speckled	50
Microhylidae	30	Rat Snake, Olivaceous	57
<i>Micrurus alleni</i>	60	Reptiles	42
<i>nigrocinctus</i>	60	Reptilia	42
Moss Salamander,		<i>Rhadinaea calligaster</i>	56
Picado's	29	<i>decipiens</i>	56
Mussurana	49	<i>decorata</i>	56
Mussurana, Montane	49	<i>guntheri</i>	57
Narrow-mouthed Toad,		<i>serperaster</i>	57
Black	30	Salamander, Monteverde	29
<i>Nelsonophryne aterrima</i>	30	Ring-tailed	29
Night Lizard, Tropical	47	Salamanders	29
<i>Ninia maculata</i>	55	<i>Sceloporus malachiticus</i>	45

Scincidae	47	Treefrog, Drab	40
Scorpion-eater	58	Masked	39
Seep Snake, Tropical	52	Meadow	38
<i>Sibon annulata</i>	57	Pin-striped	38
<i>dimidiata</i>	58	Tree Snake,	
<i>longifrenis</i>	58	Blunt-headed	52
Skink, Bronze-backed		Dry Forest	52
Climbing	47	Plain	52
Litter	47	<i>Trimetopon gracile</i>	59
Skink-eater	57	<i>pliolepis</i>	59
Skinks	47	<i>simile</i>	59
<i>Smilisca phaeota</i>	39	<i>slevini</i>	59
<i>sordida</i>	40	Typhlopidae	48
Snail-eater, Banded	58	<i>Typhlops costaricensis</i>	48
Lichen-colored	58	Vine Snake, Brown	55
Ringed	57	Green	56
Snake, Bird-eating	56	Short-nosed	55
Brilliant-ringed	51	Viper, Eyelash	61
Cat-eyed	53	Green Palm	61
Collared	51	Green and Black	61
Fire-bellied	54	Viperidae	61
Halloween	56	Whipsnake, Dry Forest	54
Harlequin	57	Whiptail,	
Ridge-nosed	48	Central American	46
Snakes	48	Barred	46
Snakes, Blind	48	Wood Snake	55
Colubrid	48	Wood Snake, Spotted	55
<i>Spilotes pullatus</i>	58	Worm Salamander,	
Spiny Lizard, Green	45	Common	30
<i>Sphenomorphus cherriei</i>	47	Poelz's	30
Squamata	42	Xantusiidae	47
<i>Stenorrhina freminvillei</i>	58	<i>Xenodon rabdocephalus</i>	59
Stream Frog, Lichen	39		
Mountain	38		
Red-eyed	39		
Rufous-eyed	39		
<i>Tantilla annulata</i>	58		
<i>armillata</i>	58		
<i>melanocephala</i>	59		
<i>schistosa</i>	59		
Teiidae	46		
Toad, Dry Forest	35		
Giant	36		
Golden	36		
Green Climbing	35		
Litter	36		
Wet Forest	36		